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Original Communications.

ENTEROCLYSIS IN THE SUMMER DIARRHŒA OF CHILDREN, WITH A REPORT OF SEVENTY-EIGHT CASES, TOGETHER WITH THE RESULTS OF LABORATORY INVESTIGATIONS.

BEING A THESIS TO WHICH WAS AWARDED THE PRIZE OFFERED BY THE CHAIR OF MEDICINE IN THE JEFFERSON MEDICAL COLLEGE, MAY, 1893.

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EXPERIMENTS.

IT has been generally believed that a pressure of nine pounds will cause rupture of the peritoneal coat of the intestines, and that the ileo-cæcal valve will prevent the entrance of liquids from the colon into the small intestines. To determine this question independently I undertook a number of experiments, the results of which are hereby detailed:

Experiments 1, 2, 3, 4, and 5 were made on dogs. Four doses, of 20 grains each, of compound powder of jalap were administered at intervals of four hours, causing profuse, watery stools and severe vomiting. The object of administering jalap was to produce a violent gastro-enteritis, and thereby, if possible, to weaken the intestinal coats. In every case the post-mortem examination revealed a severe inflammation of the mucous membrane of the stomach, small intestine, the ascending and the transverse colon. With a reservoir containing two quarts of water, and suspended at an elevation of three, four, or eight feet, a flexible rubber catheter was connected, the

free extremity of which was introduced into the rectum.

Experiment 1.—Male pup; weight, 10½ pounds. The experiment proved unsuccessful, as the careless introduction of the catheter caused a small perforation of the gut near the sigmoid flexure, through which the liquid found its way into the abdominal cavity.

Experiment 2.—Full-grown dog; weight, 14 pounds; elevation of reservoir, four feet. The liquid readily passed the ileo-cæcal valve into the small intestine.

Experiment 3.—Full-grown dog; weight, 11 pounds; elevation of reservoir, eight feet. The powerful pressure caused considerable distention of the colon; only a small amount of water passed the ileo-cæcal valve, the greater part being forced back through the anal orifice. The ascending colon was then ligated at a point about three inches beyond the ileo-cæcal valve, and the fluid was again introduced from an elevation of eight feet. The anal tissues were at the same time firmly compressed around the catheter to prevent regurgitation of the injected fluid. The colon was not ruptured; after it had been completely filled the flow of water ceased.

Experiment 4.—Full-grown dog; weight, 13 pounds; elevation of reservoir, three feet. The liquid slowly passed the ileo-cæcal valve into the small intestine and into the stomach.

Experiment 5.—Full-grown dog; weight, 12 pounds. The ileum was ligated at a point about ten inches from the cæcum, and the water was forced into the bowel from an elevation of eight feet. The anal tissues were firmly compressed. No rupture of any of the intestinal coats followed.

Experiment 6.—Female child, three weeks old; dead of pneumonia; elevation of reservoir, three feet. The liquid refused to pass the ileo-cæcal valve. Upon examination the valve was found to be normal.

These experiments demonstrate that it is almost impossible to rupture an inflamed bowel, even if obstructed. Before rupture occurs the contraction of the sphincter muscle is overcome, and the water is expelled or escapes gradually through the ileo-cæcal valve into the small intestine and into the stomach, whence it may be expelled by vomiting. Experiment 6 demonstrates that, although the ileo-cæcal valve be normal, irrigation of the small intestine is not always possible. Experiments 1, 2, 3, 4, and 5 show that in some cases irrigation of the small intestine may be successful.

Method of Execution.—To insure perfect success with enteroclysis the procedure must be practised intelligently and systematically. To determine accurately the quantity of fluid used in each case, a graduated glass bottle of a capacity of at least two pints is required. An O'Brien's rectal flexible rubber catheter ten inches long and one-quarter of an inch in diameter, with two openings on opposite sides close to its tip, is attached to the free extremity of an ordinary tube, four feet long, connected with the reservoir.

In pursuing this course the injection of air is avoided, and the rate of discharge of liquid may be regulated at will by simply compressing the rubber tube with the fingers or by means of a clamp. It is better to use a long catheter for irrigation of the bowel, so that, if desired, it may be introduced beyond the sigmoid flexure; in cases of catarrhal proctitis a shorter tube is preferable.

In practising the irrigation the child is placed on a bed, protected by a rubber cloth or a Kelly pad, and the catheter, lubricated with vaseline, is gently introduced into the anus. The successful introduction of the catheter is not always an easy matter. Often the sphincter muscle resents this process; in other cases it will not contract sufficiently to hold the catheter in position. The resistance of the sphincter may be overcome by placing a flannel blanket under the child, to prevent it from coming into contact with the cold surface of the rubber cloth, or by bathing the anus with warm water. The failure of the sphincter to contract may be compensated for by compressing with the thumb and index-finger the anal tissues around the catheter after its introduction.

As the rectum is not a straight tube, the catheter should be flexible; if a hard tube be used, the sensitive mucous membrane may readily be injured. For its first inch the catheter should be introduced in the direction of the umbilicus, and then towards the hollow of the sacrum; by semi-rotary movements it can be gradually insinuated into the lowest part of the sigmoid flexure. The most satisfactory results are obtained by holding the vessel containing the fluid about two feet above the patient, and after a small amount of the water has been allowed to *trickle* into the gut, to gradually raise the reservoir to the height of three feet. When the bowel is fully distended, slight additional pressure may be exerted by raising the receptacle a few inches higher still, which in most cases will be followed by the immediate and forcible expulsion of both catheter and fluid. The height of the column of water will represent the mechanical force

by which the fluid is impelled into the intestine under constant pressure. By reason of the mass of water which fills and distends the intestinal canal, the muscular layer is stimulated to contraction; therefore, the more gently and slowly the fluid is allowed to trickle into the bowel the less resistance, as a rule, is encountered from the gut and sphincter muscles. The temperature of the water should vary with the intensity of the fever and the resistance this offers to the antifebrile process. Water cooled by ice to a temperature of from 52° to 55° F. is used in cases presenting symptoms of mild pyrexia. When the temperature of the patient indicates hyperpyrexia, the temperature of the water is reduced to 43° F. The amount of water to be injected into the gut may vary from one to two or even three pints. Three pints are rarely necessary, and quite as satisfactory results are obtained by using from one to two pints; in fact, while this quantity is used in the course of the entire irrigation, from ten to twelve ounces are as much as the bowel will in most cases retain before expulsion takes place. To produce a greater and more lasting reduction of temperature, an irrigation lasting from six to ten minutes did more good with a definite quantity of water than with the same amount of water, though at a temperature of from five to ten degrees lower, but lasting only four or five minutes. Of course every case possesses individual characteristics, and irrigation is used only so long as the symptoms seem to require it. Much depends on the relative capacity of each child. If it be weakly, it is not always a good plan to irrigate with water at a temperature of 43° F., however intense the fever may be. An irrigation with water at a temperature of from 60° to 65° F. will, in such a case, accomplish as much as one with water of a still lower degree, without exposing the already exhausted system to a powerful shock. In several cases in which the temperature taken in the rectum ranged between 104° and 105° F., and the temperature of the water entering the rectum was 45° F., the temperature of the fluid on leaving the rectum, after an irrigation lasting from six to eight minutes, was 59° F., showing an increase in temperature of 14° F. The temperature is taken immediately before and again about forty-five minutes after the operation. This is necessary for a correct insight into the effects of the operation and for the successful conduct of the treatment. The introduction of the thermometer after the irrigation is attended with little difficulty, as the patient feels comfortable and is less restless than before. It is absolutely useless to take the temperature directly after the operation, as it will indicate nothing of any clinical value. It is always normal or even subnormal in the rectum, while in the axilla it rises from $\frac{2}{10}$° to 1° F., with a subsequent gradual fall.

The number of irrigations and the intervals between them will depend mainly on the gravity of the case; they may be given every four hours, or even at shorter intervals, during the height of the fever. Caution must, however, be exercised that the treatment be not overdone. While, as a rule, the effects of an irrigation persist for from three to six or seven hours, it is not always so, and particularly in the severer cases, in which the reduction of temperature may be of short duration. In a few isolated cases the reduction is considerable and seems to be sufficient, but rises at once after the operation. Examination of the temperature-charts of Cases 576 and 461 will show these to be instances of this kind. In these the irrigations were repeated every hour and a half or two hours until in both cases, after the fourth operation, a more marked and more lasting remission could be observed. As a rule, if the rectal temperature is found to be two degrees lower from three-quarters of an hour to an hour after the irrigation, the operation is not to be repeated for at least two hours. If at the expiration of this time the temperature does not exceed, but still remains in the neighborhood of 102° F., the treatment with ice-water is discontinued, and irrigation with cold water at a temperature of from 65° to 70° F., or with a normal salt solution (six-tenths of one per cent.), is practised night and morning until the temperature becomes normal. It is a good plan to continue the saline irrigations at a temperature of from 80° to 85° F. in cases of infectious diarrhœa, even after the fever has disappeared, as I am convinced that a more speedy convalescence of the little patient is thereby brought about.

The first operation should always be personally superintended, as there is often great reluctance, if not decided opposition, on the part of the mother. After the irrigation the child is wrapped in a thin woollen blanket, laid upon a bed, and generally falls asleep.

I believe that the beneficial results obtained by irrigation of the intestines are due to the abstraction of heat by cold water in hyperpyrexia and to the stimulating effect of warm water in the algid state, but still more largely, whether warm or cold water or a normal saline solution be used, to ridding the bowel of de-

composing and septic matters, which, becoming absorbed, give rise to high fever and nervous symptoms.

Irrigation of the stomach is undoubtedly of value in cleansing the viscus and placing it in a better condition to digest the food; it is preferably done before feeding. An apparatus similar to that employed in the practice of irrigation of the intestines can be used. The end of the catheter is placed on the back part of the child's tongue, when a swallowing motion will be noticed, and the tube may be passed into the stomach. This procedure, however, is not always advisable. Sometimes the stomach of the infant is in such an irritable condition that the introduction of the tube is followed by attempts at vomiting during, and continuous eructations after, the operation, which tend to increase the already marked exhaustion of the little sufferer.

Direct and Indirect Physiological Effects of Cold on the Living Organism.—Ludwig (*v*) teaches the following in regard to the direct and indirect effect of cold on the living organism: "Among the influences which are able to call forth the activity of the sensory nerves, cold and mechanical causes hold the first place." The intensity of the irrigation depends on the rapidity with which the change in temperature takes place, on the temperature of the body, and on the extent of surface exposed at the time to the change of temperature. "The greater the difference between the temperature of the body and that of the agent acting on it the more decided will be the effect produced." Enteroclysis with cold or iced water is, therefore, a capital stimulating remedy, and the reviving influence on the organism can clearly be determined. Aside from the abstraction of heat and the stimulation, a third effect may be ascribed to this treatment. Winternitz (*w*) describes the revulsive effect of the influence of cold on the cutaneous surface of the whole body as follows:

"That there is a revulsive effect on the mucous membrane of the intestines, as a result of the influence of cold, cannot be doubted. After the transitory contraction of the blood-vessels reaction sets in, the muscular coats of the arteries relax, and thus the blood-vessels of the intestines and of the immediate surrounding structure are considerably dilated and their capacity as a whole increased."

"Each systole of the heart throws a portion of blood into the arteries, which take it up with avidity, without increased tension, because their capacity being increased, they can carry more blood than before. In the same way the relaxed veins can stow away more of the blood which passes into them. The dilated mesenteric vessels, acting like a sponge, absorb the blood from the inner vessels, relieve them of their contents, and lower their tension. As a result, the blood-pressure in other organs will be lowered, the amount of blood they contain will be diminished, the flow of blood will be retarded, the activity of the heart will be increased, the temperature will be reduced, and the nervous system will be quieted."

My experiences are in entire accord with these views. I believe that the high temperature and the nervous manifestations are due to the absorption of poisonous ptomaines and leucomaines, and that the beneficial results of irrigation undoubtedly depend largely on the removal of these poisonous materials.

Influence of Irrigation on the Temperature.—A reduction of temperature of greater or less degree is in all cases observed to follow irrigation of the bowel. The maximum reduction, as observed, is of course most marked in the rectum immediately after the withdrawal of the catheter. In a short time the temperature rises for some minutes; it then remains stationary for a little while, and again ascends more or less rapidly, rarely reaching the previous elevation. Cases 479, 533, and 448 will illustrate this fact. Owing to the contraction of the blood-vessels of the intestine and the surrounding parts during the injection of cold water, the temperature in the axilla rises from two-tenths of a degree to a degree, to remain stationary for a short time after the flow of water is interrupted; but it soon falls, in association with a corresponding or greater elevation of temperature in the rectum.

The duration of the effect of the irrigation is more considerable in mild cases and least in grave cases with high fever. If the temperature declines but little after the first or second irrigation and soon rises to near its former level, the case is likely to be a severe one (Cases 451, 534). If, on the contrary, the temperature rises slowly, the chance of a speedy recovery is more favorable, especially if there be also favorable changes in the pulse, respiration, and nervous system. The resistance, therefore, which the fever offers to its reduction will indicate the gravity or mildness of the case, and allow us to judge of the value of the treatment. A lasting diminution of the temperature is in most cases brought about by each irrigation, and even in those instances in which the first irrigation is not followed by a lasting reduction a further rise can surely be prevented.

It may thus be said that by means of enteroclysis high temperature may be reduced by small remissions, so that the intensity of the febrile process is gradually but surely diminished, while the heat-regulating apparatus of the body is permitted to carry on its function at more nearly the normal level. It might be supposed that these beneficial results are produced by diminishing heat production and increasing heat dissipation, but to my mind they are to be principally attributed to the removal of septic material from the intestines.

Brand (*x*) says, "It would seem not illogical that, if a method of treatment has the power to bring back the heat-regulating organs to their normal condition, it may have a similar influence on some of the other protoplasmic structures just as important to the maintenance of life as the respiratory centre, the nerves governing the heart and those regulating the flow of the blood and the nutritive fluids of the body."

Ziemssen (*y*) has observed the temperature of the stomach to fall 0.9° C., or 1.7° F., on the injection of cold water into the rectum, and says, "Since we are in a position to cause a reduction of temperature in such a distant organ by means of cold irrigation, how much more will we be able to influence as we desire the neighboring organs of the rectum and large intestine in their temperature and thereby in their process of nutrition?"

M. Thermes (*z*), in a paper presented to the Société Hydrologie, 1878, also demonstrates that the judicious application of cold to the epidermis and mucous membrane will increase the number of blood-corpuscles and improve their quality. Tepid irrigations with water at a temperature closely approaching that of the blood heat the large intestines for a shorter or longer duration, probably by diminishing heat dissipation and by heating the surrounding structures.

Influence of Irrigation on the Circulatory Organs.—Keating and Edwards (A), as a result of clinical studies of the pulse in childhood, state that the average pulse of the healthy infant between the first and second month is 137 per minute; from the third to the sixth month, 128; and from the sixth to the twelfth month, 120; that the pulse in children is likely to be very irregular, and that it is more rapid while the child is awake, particularly if standing. The latter assertion Goodhart (B) denies, stating that in several cases Newnham noted the pulse-rate to be three or four beats more frequent during sleep. That the pulse in the young child is often very irregular, whether awake or asleep, is not disputed; hence the results furnished by an examination of the pulse in young children cannot be considered of the same definite value as in the adult.

In summer diseases the pulse generally ranges between 120 and 180 beats per minute. Intestinal irrigation with cold or iced water will subdue this frequency even more promptly than it does the temperature. The pulse-rate is often diminished from ten to twenty beats a minute, and in mild cases a favorable lasting result is sometimes obtained after the first or second irrigation. An insufficient influence on the frequency of the pulse seems again to indicate a more or less dangerous condition of the child, and in such cases the amount of alcohol is to be increased, without, however, discontinuing or reducing the number of irrigations, as it becomes apparent that the heart, beginning to grow weaker, is induced to do fresh work by the irrigation with cold water, together with a liberal allowance of alcohol. Tripier and Bouveret (C) claim that cold water is a true heart-tonic; that it prevents the acceleration of the pulse and makes it stronger; and that it diminishes and removes the first sign of heart-weakness. Every irrigation is followed by a prompt stimulation of the arterial system. The marked and permanent diminution in the frequency of the pulse is soon accompanied by a favorable change in its quality. The more often the irrigation is repeated the more persistent will become the energy of the heart.

Influence of Irrigation on the Digestive Organs.—The effects of enteroclysis on the digestive organs are marked during the first twenty-four hours. Vomiting, one of the most distressing symptoms, ceases in most cases after the first or second irrigation.

The changes in the mucous membranes visible to the eye permit the assumption that a similar change is in progress in the mucous membrane of the gastro-intestinal tract, and that a tonic action is brought about in the circulation of these parts. At any rate, the catarrhal symptoms disappear; the diarrhœa diminishes from the outset, and often ceases after the third or fourth operation. The tongue and the mouth, which were dry, red, and hot, assume their normal state. The abdomen becomes moist, even soft and relaxed. The intense thirst, such a characteristic symptom, soon moderates, and a general improvement is brought about in the mucous membrane of the whole gastro-intestinal tract. Roehring (D) has proved that irrigation of the

intestines increases for a time the secretion of bile. Increased secretion of bile, however, always causes a more active peristaltic motion.

Influence of Irrigation on the Nervous System.—Nervous symptoms of a serious character, such as stupor or convulsions, are not uncommon in bad cases. Griesinger (E) says, "Of whatever character the disturbance of the brain and nervous system may be and of whatever intensity, one thing alone will restore the normal equilibrium and relieve the condition,—sound normal sleep." Sleep in most cases sets in shortly after each enteroclysis and continues until the next rise of temperature makes itself felt. This restoration of the disturbed functions of the nervous system cannot but influence the prognosis of the disease in a favorable way.

Convulsions also yield more readily to the cooling process than to any therapeutic measure, but should these still continue after the third or fourth irrigation, the prognosis must be considered unfavorable. Quite often, even after the first or second irrigation, the convulsions abate or entirely cease (Cases 436, 533). The restlessness, however, reappears as the immediate effects of the cooling process pass away. Improvement and even total disappearance of the gravest symptoms do not always coincide with the reduction of the temperature. This fact seems to prove Tripier's (F) assertion that cold water has a direct action on the nervous system to a certain degree independently of the abstraction of heat.

(To be continued.)

CREOSOTE IN TUBERCULOSIS PULMONUM.

READ BEFORE THE ASSOCIATION OF AMERICAN PHYSICIANS, MAY 30, 1893.

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IN the presentation of a paper to one of our societies we are not allowed the liberty of even our immediate forefathers. We are compelled to entirely eliminate the "personal equation," whereby the matter becomes perhaps more exact, but often less interesting. This fact is illustrated in one of the earliest contributions "On the Medicinal Properties of Creosote," which the author, John Elliotson, M.D., F.R.S., President of the Society, read at the opening of the Society's apartments, February 24, 1835, quoting the remark of Lord Bacon, that physicians apply themselves too exclusively to general indications, neglecting the peculiar properties of remedies in particular diseases. Bacon says, "they merely go on in their prescriptions, *addendo, et demendo, et mutando . . . quid pro quo substituendo,*" and he advises that "some physicians of education and practical knowledge shall devote some time to the exhibition of medicines in particular diseases."

Elliotson says Bishop Berkeley killed creosote by overpraise, just as Pope killed Berkeley when he said,—

> "Manners with candour are to Benson given,
> To Berkeley every virtue under heaven."

Elliotson tried creosote in phthisis and epilepsy, and discovered the virtue of it in obstinate vomiting. He says, "While I was trying creosote in phthisis and epilepsy, Asiatic cholera became epidemic in London. Two cases occurred at St. Thomas, and creosote was given with the effect of immediately arresting the vomiting." The author saw no benefit from creosote administered internally in the treatment of phthisis, but found it of great value when used by inhalation. Thus, "I am satisfied that it is no remedy for tubercles. Where, however, only a single ulcer, or but a small number exist in the lungs, and there is no disposition to further tubercular formation, it is very beneficial. A young gentleman with a large solitary cavity in his left lung has completely recovered, and not the slightest morbid condition is discoverable by the ear." He knew the case of a lady who steadily augmented her dose of creosote to 40 drops before it disagreed.

All this was in 1835, only three years after creosote was discovered.

Disregarding now the literature of tar, the vapors of which were recommended in phthisis, as long ago as 1817, by Sir A. Crichton, physician to the Empress of Russia, and by Morton, of Philadelphia, as early as 1834, as a treatment "with which nothing could compare," we come to creosote, the essential ingredient of tar.

Creosote, κρέας, flesh, Attic κρέως, Doric κρῆς, hence creasote, creosote, or cresote, δωζειν, to save, was separated by Reichenbach, in 1832, from wood-tar, and received its name from the property of preserving meat from decomposition without rendering it unfit for nutrition. Two years later, Runge extracted carbolic acid from coal-tar. Gerhardt gave this product the name phenol. The substances were confounded until 1853, when Gorup-Besanez declared that the creosote extracted by Reichenbach from beechwood tar

was an entirely different body from carbolic acid, in that creosote consisted of a mixture of guaiacol and cresol, while carbolic acid is crystalline and contains but one atom of oxygen; hence it is not really an acid, but an alcohol, and should be known as phenyl-alcohol. Creosote is the cause of the conservation of meat in smoking. A piece of fresh meat allowed to remain half to one hour in creosote water takes the smell and taste of smoked flesh, and withstands decomposition absolutely. Insects and fish perish at once in creosote water, and plants watered with it wither away. According to Miguet, a young and vigorous rose-bush in full bloom thus treated perished in the course of eight days. A few drops of the same solution applied to a red rose deprived it both of color and life (Stillé).

The toxic effect of creosote is, however, much less than that of carbolic acid. In a case reported by Pereira, a fatal dose was 120 drops, diluted with double the quantity of water. According to Taylor, 90 drops well diluted with water may be taken safely. The experiments by Husemann and Ummethum showed that it required, by subcutaneous injection, five times as much creosote as carbolic acid to kill frogs, and more than twice as much to kill pigeons. In rabbits, one gramme constitutes a fatal dose of carbolic acid. This quantity of creosote produces in the rabbit no symptoms at all, and death occurs only after the exhibition of four grammes.

The virtue of creosote depends upon its purity, especially upon its freedom from carbolic acid and pyrogallol.

According to Vigier, creosote owes its effect not to any single chemically-defined substance, but to a mixture of cresol, especially to guaiacol; also to derivatives of pyrogallol, which last substance is toxic. Guaiacol, which is the active principle of creosote, according to Picot, Lepine, and others, is more readily tolerated than creosote, but it is seldom found pure in commerce. Impure creosote, that which contains carbolic acid, etc., irritates the mucous membrane of the stomach and intestines, and produces local inflammation. Some of the contradictory testimony regarding the remedy is thus explained.

The uncertainty of the drug in former, even in recent, use is illustrated in the statement by Oertel (*Handbuch der Allegemeine Therapie*, 1882) that creosote acts like carbolic acid, but as the composition of creosote is so uncertain, it is better substituted by carbolic acid.

Dagivait, indeed, maintains that failures are due to impurities. He published a communication on "Impure Creosote the Cause of Failure in the Treatment of Pulmonary Tuberculosis."

In a healthy man, therapeutic doses produce no action whatever on the circulation, nutrition, calorification. The proportion of urea, of phosphoric acid in the urine, remains the same. The uric acid only diminishes. Once absorbed in the body, creosote escapes chiefly by the lungs and the kidneys, and there is observed in cases of the absorption of toxic doses, polyuria, dysuria, brown discoloration of the urine, bronchial excitation with hyperæmia, and the impregnation of the breath with creosote. The taste is preserved in the mouth in certain cases, which seems to prove that creosote is eliminated also by the salivary glands.

Bouchard found that it required seventeen millimetre cubes of creosote per kilogramme to kill a rabbit. By subcutaneous injections of an oleaginous solution of creosote, it required a dose nineteen times as strong. One may, without danger, inject every day in a rabbit 25 millimetre cubes per kilogramme in an oleaginous solution. This daily dose, which is without danger to an animal, is equivalent to fifteen grammes to a man weighing sixty kilogrammes,—*i.e.*, ℥ss to one hundred and forty pounds. A non-fatal dose produces as a sole phenomenon in animals a retardation of respiration. The number falls from eighty to sixteen in the minute. Long and anxious pauses occur. Bouchard had remarked upon this retardation of respiration in man.

Forty-five years had elapsed since the discovery of creosote. The drug was widely, almost wildly, used, and then forgotten. From this oblivion it was rescued in 1877 by Bouchard and Gimbert, the real pioneers in this therapy, who ascribed to it great virtue in the treatment of phthisis.

Sommerbrodt has just published a statistical essay of the use of creosote since 1887, in chronological order, showing the gradual development in creosote therapy. The most remarkable result is the increase in the daily dose, and the author confirms the statement originally expressed that the more creosote is tolerated during the day the better is its effect. While the daily dose for an adult in former years reached a maximum of ½ gramme, in later times the dose has been gradually increased to 4, even to 8, grammes per day (in children ½ to 1½ grammes), not only without injury, but with the best effect. Cough and expectoration disappear. The undesirable use of morphine is rendered superfluous. Night-sweats cease, the appetite becomes sometimes

enormous, the body-weight gains. The local effects in the lungs disappear, or remain only as relics. Even in the grave, apparently hopeless cases remarkable, though of course only temporary, results are accomplished. While the author saw formerly in small doses only essential improvement, latterly with large doses he has been able to accomplish cures, and that, too, not only in lung tuberculosis, but also in surgical tuberculosis and in scrofula. The increase in the consumption of the drug may be appreciated by the statement that in the Moabite Hospital the quantity used in 1877 was one kilogramme, fifty grammes; in 1888, 4.225 kilogrammes; in 1891, 11.7 kilogrammes; and in 1893, 18 kilogrammes,—*i.e.*, about forty pounds.

On the other hand, Fürbringer declares that he has not given creosote in the last one or two years, because he had not obtained success enough to justify it. In half of the cases there was no influence either favorable or unfavorable; in one-fourth of the cases the influence was directly injurious. The remedy hurt the stomach. Patients lost appetite and became miserable. The rest experienced various subjective and objective effects, but when these apparent results of creosote were compared with hygienic or dietetic procedures without creosote, there was no difference to record.

May these diametrically opposite opinions of good clinicians be reconciled in the study of the action of the drug?

Guttmann found that in solution of 1 to 4000 creosote exercised a marked inhibitory faculty on the growth of tubercle bacilli, and in solution of 1 to 2000 actually destroyed it. Guttmann's experiments were made in 1887 out of the body, but deductions could not be drawn thence in the body, because the concentrations were too great. In order to secure a proportion of 1 to 4000,—a concentration which hinders the growth of tubercle bacilli,—more than one gramme of creosote would have to circulate in the blood.

Cornet showed that large quantities of creosote in the stomach did not prevent the development of the tubercle bacillus in guinea-pigs. In the proportion of 1 to 100 it fails after twenty hours' exposure to destroy tubercle bacilli in the sputum. A saturated aqueous solution does not destroy the tubercle bacillus in cultures in twelve hours. (Sternberg.)

In Trudeau's experiments, the rabbit inoculated with tuberculosis, and treated with creosote subcutaneously, presented the same lesions as control animals not so treated.

Bouchard deduced from his experiments that 3.5 grammes (about one drachm) of creosote would suffice to destroy bacilli in the middle of the body of a man weighing sixty kilogrammes (one hundred and forty pounds), but Burlureaux injected into tuberculous patients as much as forty grammes of creosote a day. Now, according to Bouchard, all these bacilli ought to have been killed, and the patient ought to have recovered; but, says Peter, these results did not occur.

Albu's experiments show that tuberculous sputum taken from bodies saturated with creosote maintains its virulence. He injected such sputum in the anterior chamber of the eyes of rabbits. The course of the disease was perfectly typical. By the nineteenth day tubercle bacilli formed their first colonies visible under the lens. Subsequent changes ensued in course. Only one animal showed miliary tuberculosis.

In a second series of experiments such sputum was injected into guinea-pigs, intraperitoneal. The peritoneum showed virulent material in six weeks. Hence there is no specific influence of the drug.

The clinical proof of the effect of the remedy in tuberculosis is the influence on the fever. Creosote has no real influence on the fever. The writer has tested this fact in every way. Though the patient be saturated with the drug by every avenue,—by the stomach, by the lungs, by the bowels, by the skin, by all these methods at once,—creosote does not control the fever. Thus, there is no specific influence and no real—that is, no radical or no direct—cure. But if creosote can cure indirectly, or if it will only arrest the disease, or if it will only relieve complications, it will hold its place until something radical is found. Sommerbrodt says that though a scientific explanation is still lacking, he believes that creosote alters the tissue of the cells and the chemical condition of the juices of the body, so that they no longer furnish a suitable culture soil for the tubercle bacilli, the colonies of which will not grow in it.

Ludwig maintains that creosote destroys the toxine of the tubercle bacillus. This is a fine theory, but undemonstrable at present. After ten injections, catarrhal cases at the apices will show no bacilli. The caseous will soon assume the mucoid form, which seems to exercise a toxic effect on the microbe.

According to Peter, injections of guaiacol and creosote act by substituting a fugitive and curable hyperæmia for a tuberculosis hyperæmia. Under the drug, cough and expectoration diminish, fever and night-sweats cease, appetite returns, and the patient gains weight

and strength. The benefit is due to its elimination by the lungs. It excites a simple and transitory inflammation, which substitutes a specific catarrh.

Dujardin-Beaumetz, indeed, declares that creosote in appreciable dose congests the bronchial mucous membrane and promotes hemorrhage, while Guiter claims that creosote acts as an irritant which favors cicatricial sclerosis. Finally, Peter believes that creosote is more useful in protecting healthy tissues than in curing those which are already invaded. All these views are theories, and though they are advanced by clinicians, are undemonstrable by clinical proof. Creosote acts on the stomach. This fact has been observed by Walche, Hopmann, and Klemper. It excites the appetite and lessens the distress of indigestion. In fact, this action was the first observed. Most patients improve decidedly for a time under the immediate change of nutrition. And this action is well understood; for, according to Brunton, while 1 part of chlorine in 8540 parts of a saturated solution will arrest the digestive action of ptyalin upon starch paste, and corrosive sublimate is so enormously destructive as to arrest its action even in 1 part to 51,000, creosote has no action on ptyalin, even in saturated solution, and has but a very feeble action upon pepsin. Thus, creosote merits its name.

It is impossible to proceed further in the study of the action of a remedy in tuberculosis without more definite knowledge of the nature of tuberculosis, and what it is that is to be accomplished. In this regard there is new, or at least more definite, knowledge. It is known now that the whole character of consumption—*i.e.*, tuberculosis pulmonum—was not determined with the discovery of the bacillus tuberculosis. This is the key-stone, it is true, but there are other stones really equally important which go to make up the structure. It is now known that tuberculosis of the lungs, at least, is not a pure process. In test-tubes a culture, to be kept pure, must be secluded from the outside air as a *sine quâ non*. This seclusion does not obtain in the lungs. On the contrary, the tubes containing the cultures—*i.e.*, the bronchial tubes—are all open to the air, and are subject to constant contamination. So that human differs essentially from laboratory tuberculosis.

The contaminating bacteria of sputum have been recently investigated by Evans and Babes. Maragliano called attention to the possibility of their clinical signification, as did also Czaplewski, Ziegler, and Thorner. Long ago, Koch, in his work, and after him Gaffky, encountered the tetragonus as an occasional associate of the tubercle bacillus, and spoke of its pathogenic properties.

Cornet, on "Mixed Infection," says it is well known to every one who has experimented with tuberculous sputum in animals, that many of the inoculated animals, especially rabbits, often perish in a few days from septic processes. For years, in his experiments, he avoided the sputum of phthisis florida and selected rather that of chronic cases, because experience taught him that such sputum rarely causes death by accidental disease. In one case described with acute exacerbation, there was found in the sputum, besides the tubercle bacillus, partly isolated and partly abundant diplo- and streptococci. Cultivation on agar gave almost a pure culture of streptococcus colonies. On post-mortem examination, microscopic sections showed, especially in the walls of the cavities and caseous parts, streptococci and monococci thickly sown. In agar developed innumerable streptococcus colonies like those found in sputum, and besides, but in less number, perhaps in the relation of one to twenty, the staphylococcus and pyogenes aureus. The streptococci grew in bouillon in firm masses and long chains, without making the fluid opaque,—a property, according to Von Lingelsheim, peculiar to pathogenic streptococci. They resemble in form and growth the streptococcus described by Curt as streptococcus agglomeratus. A mouse inoculated died in three days. The same streptococci were obtained from the blood of the heart, liver, and lungs in pure culture. A rabbit and a guinea-pig injected died, both in twelve days. Their organs were filled with streptococci.

Of the twenty cases investigated post mortem, and, so far as possible, *intra vitam*, there occurred twelve times such a dominating presence of streptococci that its work in the production of symptoms could not be questioned.

Petruschky confirms this fact. He found the streptococcus dominant in the great majority of cases studied. In eight of fourteen cases streptococci were found in the blood and juices of all the organs, whereby the significance of streptococcus infection is sufficiently shown. Pasquale also demonstrated streptococci in various tuberculous processes from the dead body. Therefore the expression "mixed infection" is not exactly correct, because it is not a case of simultaneous invasion. It is rather a secondary invasion of streptococci,—that is, it is properly a wound infection, and should be characterized as a "secondary infection." The inundation of the whole body with streptococci induces septicæmia. Hectic fever is distinguished by its

morning remissions and by its more or less sudden evening elevation. It is the fever of erysipelas, acute suppurative processes, puerperal fever, produced by pyogenic cocci, in the great majority of cases by the streptococcus. Koch calls this seesaw record the "streptococcus curver."

Can it be that creosote is destructive to these associated micro-organisms?

Upon this subject there is less definite knowledge.

Marfan declares that creosote has an action more energetic on the micro-organisms of secondary infection than on the bacillus itself. From this point of view it is, he says, "the most puissant of the balsams." Under its influence the cough diminishes, the expectoration and the râles become less abundant.

Sternberg found creosote fatal to micrococci in the proportion of 1 to 200.

Creosote was found by Werneke to destroy yeast in a dilution of 1 part to 500 of water, and by Bucholtz to kill ordinary bacteria in a dilution of 1 part to 1000 of water. This difference enables us to arrest fermentation in the stomach depending upon the presence of low organisms, while the digestive action of pepsin is not, or is only very slightly, disturbed (Brunton).

It is not likely that creosote neutralizes or destroys the streptococcus itself, because it shows no real effect upon the fever; but it certainly does inhibit the growth, or actually destroy, some of the organisms which induce fermentation in the stomach and intestine, without interfering with the actual processes of digestion, and this is the actual knowledge in hand at the present time regarding the action of the drug. Thus, creosote contributes to the cure of consumption, as does arsenic, hydrochloric acid, benzoate of soda, etc., through the avenue of nutrition.

In proof of the fact that the remedy acts only symptomatically, Albu cites an instructive case. A fifty-three-year-old laborer was received on the 11th of November. The first time he was treated with tuberculin, the second time on the expectant plan, the third time with creosote. Each time he regained the ten or twelve pounds which he had lost outside the hospital. This influence is to be ascribed only to the improved hygiene of the hospital.

Creosote is best given in gelatin capsules, 0.1 creosote with cod-liver oil. Pure creosote is cheaper. Sommerbrodt uses the preparation of Hartmann and Hauers, of Hanover. It may be given in a mixture of two parts of tincture of gentian in milk or wine. It should never be taken on an empty stomach; best immediately after the three chief meals. It never hurts the stomach. It increases menstruation, consequently it should be checked during that period. It may be continued for years, and must be continued long after apparent cure. It is of course much assisted by climate, altitude, lung gymnastics, and good nourishment, but it does good even under the most unfavorable surroundings.

Vopelius declares that the more creosote is tolerated the better is the effect. He gave it in doses up to the point of tolerance, and found the improvement in correspondence. The appetite increased, and with it the weight. He gives it uniformly, beginning with a daily dose of 2 grammes, and increasing it up to 4, 5, 6, and 8 grammes a day. He gives it altogether with tincture of gentian in equal parts, with great abundance of milk as an emulsion. In shaking it about with milk, it becomes so finely subdivided that it no longer burns or irritates the mucous membranes. On the contrary, it rather stimulates the stomach to secretion.

The remedy has been administered by the stomach, by the rectum, by inhalation, and by the skin. In the rectum it has been given systematically by Revillet according to the following formula:

> Water, 200 grammes;
> Creosote, pure, 2 to 4 grammes;
> Oil of sweet almond, 25 grammes;
> Yellow of egg, 1.

The creosote is first dissolved in the oil and subsequently emulsified with the yellow of egg. This produces a liquid homogeneous, of the appearance of milk, and of a yellow color. The emulsion may be made still finer by the addition of some gum. The oil of sweet almond is preferred, because it does not produce colic, and because it contains besides matters which act as an adjuvant in the alimentation. The injection is taken preferably in the evening, as it is best retained at night. After injection, the signs of absorption show themselves rapidly. The patient instantly experiences the taste of creosote in the mouth, and the urine may assume a greenish-black color.

Creosote was injected through the thorax walls into the apices of the lungs by Lepine and Truc, of Lyons, and Gougenheim, of Paris, without any particular result.

The first idea of subcutaneous injection was entertained by Bouchard in 1875. Du Castel, in 1882, injected a peptonized creosote subcutaneously, but the introduction of the treatment is really due to Gimbert in 1886. He

was soon followed by Burloureaux. Gimbert injected a solution of creosote, in 1 to 14 grammes of the oil of sweet almond, drop by drop, stopping occasionally to avoid pain. Gimbert injected only 15 to 22 grammes of the creosotized oil,—that is to say, 1 to 1.5 of creosote. Burloureaux injected on an average 50 grammes,—*i. e.*, over an ounce and a half a day,—and he even passed this dose, and made daily injections of 100, 180, 200, and even 220 grammes, in order to saturate the organism. The remedy is really harmless.

According to Burloureaux, who treated four hundred patients in this way, where tolerance ceases the prognosis is sombre and the patients are lost. If the patient perceives the taste of creosote a long time, if his urine becomes black, if he has vertigo, torpor, and sweats, recovery is despaired of. Sweating frequently occurs at the beginning of treatment, sometimes immediately in consequence of the injection. It is occasionally profuse, and may last seven or eight hours. It is rare that it occurs alone; more often it is accompanied by fever, sometimes by chill, with headache and coldness. The extremities may become icy cold. It is the picture of the algid form of pernicious fever. It does not last longer than three-quarters of an hour, and is followed by a state of *bien être*. The dose in these cases is excessive and should be reduced.

Frey declares that the drug is not so effective when administered by the mouth or the rectum as by the skin, absorption from which is very rapid. The taste is perceived in a few minutes after administration, and the odor is noticed in the breath. Injections are almost painless. Large quantities, however, produce thickening of the skin and prevent absorption. Frey begins with olive oil, sterilized, 15 grains; creosote, 1 grain; injects at first 3 grammes, later up to 10, three times a day, and continues two or three months, after which he uses a solution of 1 in 9. The injection should be entered slowly, in the time of a minute. The most preferable sites are the back, the inter-scapular region, or the thorax.

The best results are reported in scrofula and local tuberculosis,—that is, in precisely the cases where other therapy is most efficacious. This is a typical case. A patient who had been treated surgically for tuberculosis of the manubrium sterni and the internal extremity of both clavicles was put under the creosote treatment for a voluminous suppurating adenitis of the neck. In twenty-five days he received 1800 grammes of creosotized oil by the skin and 1000 grammes by the rectum. He increased in weight seven pounds, suppuration disappeared, the adentitis receded, and the patient recovered. Another patient absorbed by the skin ten pounds of creosotized oil and by the bowel over two pounds in five months, and was cured of tuberculosis of the testicle.

In estimating the value of a remedy in tuberculosis pulmonum, we must remember how deceptive is the prognosis of the disease. Thus, there was the Baron Cloquet, affected with tuberculosis of the lungs at thirty-two years, and given six months to live,—not more,—after a consultation with Andral, Chomel, and Louis. Nevertheless he lived more than fifty years afterwards, and attended the funeral of all three of his prognosticators. It must be remembered that he lived under exceptional conditions. A spiritual egotist, he passed seven to eight months of the year in the Midi, on a splendid property which he possessed, with abundant nourishment, but delicate, that his stomach was able to digest easily. *En outre*, he never had the least fever (Peter).

Considered only from a clinical stand-point, creosote holds its place. It is an easy routine practice, and it is really, as shown, perfectly harmless in any dose. In my wards at the hospital all the tuberculous patients are put upon creosote immediately upon entry. We begin with 5 drops of a mixture of creosote and tincture of nux vomica, or, where strychnine in large dose is contraindicated, tincture of gentian, in a teaspoonful of whiskey and a tablespoonful of water three times a day after meals; increase the dose a drop daily to ten, whereupon additional doses are given at 10 A.M., 4 P.M., and at bedtime as before. The body shows signs of saturation at 60 drops per day. Six cases were treated also hypodermically with the same dose, but without any appreciable advantage over the internal treatment alone. Four bad cases with marked hectic and forty lighter cases without hectic were treated, in addition, to inhalations in the pneumatic cabinet, and this or a similar method has been tried thoroughly in France, but in my cases, aside from the psychical effect, with no additional benefit.

All our cases in early and even in late nonfebrile periods are, and have always been, regularly treated with tuberculin, which remains the only radical redress in pure tuberculosis, but which has no, or, by increase of hyperæmia, only a bad, effect upon the streptococcus infection.

CONCLUSIONS.

1. Creosote, when pure, is harmless.

2. It has no direct action upon the tubercle bacillus.

3. Tuberculosis pulmonum is chiefly a secondary infection by a streptococcus.

4. Creosote has no direct action upon this streptococcus; hence none whatever upon hectic fever.

5. It destroys lower organisms, especially those which produce fermentation, without affecting the process of digestion.

Hence, 6, the virtue of creosote, which is undeniable in most cases, is chiefly, but not wholly, upon nutrition.

THE THERAPEUTICS OF CROUPOUS PNEUMONIA.

A Paper read before the Section on Diseases of Children, American Medical Association, June, 1893.

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IN an attempt to present to you for discussion the subject which by your too partial choice has been assigned to me, I shall endeavor to keep as nearly as possible within its limits, and, with a due regard for the value of your time, I shall be as concise as possible.

It will, of course, be understood that the pneumonia known as catarrhal or bronchial, which prevails to so much greater extent in infancy and childhood, but differs so widely in both etiology and treatment, shall form no part of this discussion beyond mention. The attempt to draw an age limit around croupous pneumonia by many of the older writers has been responsible for many failures in diagnosis. While few physicians at the present time fail to diagnosticate croupous pneumonia in the adult at some time during its progress, I must record my conviction, based upon experience, that many infants go to their graves annually from croupous pneumonia, with death-certificates signed "worms," "teething," and convulsions, and that quite as many aged persons escape diagnosis and are marked "senile debility." So much, then, for former teaching that croupous pneumonia is a disease of vigorous adult life.

In the discussion of the therapeutics of croupous pneumonia I recognize the importance of tabulating only those means which through a long period of time have proved valuable in the hands of the writer. The value of papers of this kind is in direct proportion to the truthfulness of the statement therein contained and to the careful clinical observation and experience of the author.

In treatises designed for text-books it is quite proper that all the known therapeutics, both practical and speculative, should be compiled, the endorsement of which is not made by the author, and little of which has been the result of his experience. I shall, therefore, make no attempt to enumerate the so-called remedies for this disease, however much extolled by others, nor shall I criticise those which, in the experience of others, have been valued.

I recognize various therapeutic roads leading to the same desired terminus, and I care as little what means may be employed by others equally skilled as I would to know with what tools a carpenter has completed my house, if he has completed it according to the plans and specifications.

Regarding pneumonia crouposa as an acute, infectious disease, running a definite and limited course, with a pronounced tendency to recovery by natural processes alone, I might be expected to say very little concerning its therapeutics.

Notwithstanding the fact that medicines are powerless to cut short the disease, and the conviction expressed that very many will recover without any medication, few physicians possess a clientele of sufficient intelligence to risk a trial.

For this reason, as well as to favor the course of nature in repair, I devised the following prescription some twenty years ago, since which time I have made it the sole treatment from the beginning to the close of the attack.

Moreover, it has been given as a part of my instruction to medical classes for nineteen years, and it is safe to say that at least a thousand practitioners have made it their chief reliance and have so expressed themselves to me by letter or person.

The indications—therapeutic—which are met by their combination are,—

1. Satisfaction on the part of friends that something is being done for the patient.

2. The satisfaction on the part of the practitioner that he is not doing harm to his patient.

3. The promotion of diuresis.

4. The promotion of diaphoresis and increased elimination of carbonic acid with reduction of temperature.

5. Increased alkalinity, as shown by the urine, and a lessening of fibrin in the blood, promoting free mucous secretion and lessening the tendency to coagulation of blood.

6. Gentle but diffused stimulation of the nerve-centres, favoring sleep and preventing spasm.

℞ Spts. ether. nitrosi,
Potassæ acet., āā ʒiss;
Spts. Mindereri,
Aquæ camphoræ, āā ℥iii.
To be left with slightly-acid reaction, as shown by litmus. M.
Adult's dose, teaspoonful.
Child's dose, teaspoonful every two hours.

To this may be added tr. aconite or veratrum if needed, and in convalescence tr. ferri chloridi. Such additions always to be made as extra doses and not as part of the prescription.

Cardiac Stimulation.—Death approaches the sufferer from croupous pneumonia always through the heart. For this reason it is of the greatest importance to watch this organ from the inception to the close of the disease. With the trained finger upon the pulse and the educated ear over the præcordia, we catch the first signal of danger. To be forewarned is to be forearmed. Nothing is more essential to the cardiac therapeutics than a knowledge of the mechanism of heart-failure in pneumonia. *Pari passu* with the consolidation of lung, and in direct proportion to its extent, we have a mechanical obstruction to the transfer of blood from the right to the left heart, and added thereto the addition of carbonic acid anæsthesia.

This occurs at a time when ptomaines from the vegetable diplococcus are in the circulation and before the antipneumotoxin has been formed in the albumin of the blood. More blood is coming into the right auricle than can be forced through the lung by the ventricular stroke. The right ventricle becomes so distended that the apex-beat is completely removed from its original site between the fifth and sixth ribs, and the ear placed over the heart detects a heavy, dull sound, while percussion reveals an increased area of dulness. In this condition the indications for improvement in the circulation become extreme and pressing. How shall this be best accomplished? Is it philosophical to attempt relief by a *vis a tergo*, or is it more rational to attempt a *vis a frontis?*

Are these the indications for the employment of digitalis? It may be a good plan to goad the tired ox that has fallen in the furrow if you want a little more work, but you will kill the ox. It may be good therapeutics to stimulate a diseased kidney if you want a little more urine, but you will have a little less patient. It may be good practice to give digitalis to a fagged-out heart in the stage of hepatization of croupous pneumonia, but I doubt it.

Digitalis stimulates a weak heart by contracting the arteries and the arterioles, throwing the blood back upon the heart itself, and where there is no pulmonary obstruction the action is prompt and efficient, as in valvular patulencies, etc.; but the very condition which is killing the patient in pneumonia would be rendered still more dangerous by such an agent. Our fathers did eat manna in the wilderness, and they are dead; but is it strange that venesection should occur to the mind as a possible solution of the question?

Experiments in vivisection have demonstrated that a heart brought to a stand-still in such diastole may be revived by aspirating the right ventricle. It has been ascertained that even ligation of the lower extremities just sufficient to prevent the return of venous blood is followed by immediate relief of the heart. In the same manner is the explanation of the sense of relief felt by the patient upon the application of dry cups and hot flaxseed poultice to the chest-walls. Pediluvia would also prove of service were it not for the ever-present danger of assuming the erect position. Notwithstanding it comes to us as a voice from the past, there is to-day much truth in the statement that "bloodletting is good in pneumonia." Bleeding and tartar emetic marked the heroic treatment of the sturdy yeomen of the early part of the nineteenth century, and yet we find from statistics that the mortality from 1822 to 1832 was ten per cent., while from 1880 to 1890 it was eighteen per cent. Without attempting to revive a therapeutic measure so long abandoned and so universally condemned, it must be admitted that those old-time doctors struck some underlying principle in therapeutics which we, with all modern accomplishments, have failed to recognize. That principle was relief of the overburdened heart. I propose, therefore, to demonstrate how this same desirable end may be obtained without jeopardizing the life of the patient and without inflicting upon him a prolonged and tedious convalescence.

1. By Agents which determine the Blood to the Skin.—This may be accomplished by the warm pack, which, applied at a temperature of 98½° F., and protected by light woollens, envelops the body in an atmosphere of steam. By this means the peripheral nerves are soothed, and almost invariably this procedure is followed by quiet sleep.

2. By Belladonna.—This time-honored and faithful servant of materia medica is too often lost sight of in practical therapeutics.

It has a place in all hyperpyrexias accompanied by paleness of the skin and in low

stages of fever. It is particularly adapted to the condition under consideration, being an indirect stimulant to the heart, diminishing the blood-pressure by dilatation of the capillaries. It is also a stimulant to the respiratory centres of the brain, thereby inducing a more perfect aeration of the blood. The comparative harmlessness of this remedy in infancy and early childhood enables us to push it quite up to its toxical effect. It has done me yeoman's service in many an apparently hopeless case of threatened cardiac failure in pneumonia.

3. Nitro-Glycerin and the Nitrites.—These may be expected to rescue a heart after the manner of aspiration, taking off the pressure and flushing the skin even when brought to a standstill in the diastole of a full right ventricle. Aconite and veratrum viride certainly have a place in the treatment of pneumonia. The former being a sedative from the start, is too dangerous for administration by continued dosing; the latter is safer than digitalis. Fothergill's statement that "digitalis is both spur and oats to a heart" is pre-eminently true, and especially so in low forms of fever where the adynamia is due to long-continued hyperpyrexia.

I have attempted to show that the mechanism of cardiac failure in pneumonia has its foundation in an entirely different pathology. I have been led to these conclusions by clinical observations and not by theory. Finding that in this disease alone I failed to obtain the usual slowing and filling of the pulse in the radial artery, I began to investigate the cause of the failure of this grand old drug, so generally serviceable in crippled hearts.

Alcohol will prove a far better cardiac stimulant in pneumonia, by reason of its power to dilate the capillaries, thereby retaining more blood in the skin, while at the same time it may have some value as a respiratory stimulant.

Applications to the Chest.—The feeling that something may be accomplished, at least for the comfort of the patient suffering with pneumonia, by local applications to the thorax is universally believed by the laity. No doubt this idea has its origin in individual experience in many painful diseases. Shall they be cold or hot, moist or dry?

Heat is a stimulant and cold is a sedative. Heat relieves pain under any and all circumstances. Heat, locally applied, is a powerful stimulant to the heart and, by its action upon the vaso-motor nerves, lessens active hyperæmia of the brain. Physiological experiments made upon the heart of the frog show that pulsation may be restored, even after a complete cessation, by the application to this organ of a piece of cotton wrung out of very hot water, but it is again arrested by the application of cold. I prefer warm to cold applications, although some authorities, particularly the Germans, speak favorably of cold, and even ice-packs, in the treatment of pneumonia. The choice is between poultices and cotton batting protected by oiled silk.

Those of us who have experienced the relief of a congestive headache by a warm mustard foot-bath are best prepared to answer this question. Is it probable that the same relief would follow putting the feet in cotton batting instead of hot water?

Poultices are rarely properly made and seldom properly applied. Moreover, they are at best a very clumsy application, and, by adding weight to the chest-walls, embarrass still further the labored respiration. A towel wrung out of very warm water, wrapped once or twice around the chest and neatly covered by oiled silk, is a far more elegant and comfortable application. By this means the entire thorax is surrounded with an atmosphere of equal warmth and moisture, the superficial vessels are dilated, pain is relieved, and repair hastened. Stimulating embrocations are also of benefit and are useful in proportion to the chronicity of the case. The following is a favorite of mine:

℞ Ol. succini rectificati, ℥ss;
Ol. caryophilii, ♏xx;
Liniment. saponis, ℥iss. M.

Expectorants.—Cough is a constant accompaniment of pneumonia; at first dry, frequent, and distressing. It soon succumbs to consolidation of the lungs, and returns with commencing resolution. This return is hailed with pleasure by the physician and with unnecessary alarm by the laity. Perhaps it is the latter observation which has led to the employment of expectorant mixtures most heterogeneous in composition and therapeutically incompatible in application. These mixtures generally contain the entire list of so-called expectorants in the materia medica. Ipecac and squills to loosen, senega and ammonia to stimulate, wild cherry and other tannates to check secretions, alkalies to lessen viscidity of mucus, and opium to benumb sensibility.

Some of these prescriptions are a pharmaceutical curiosity. Yet one meets with them with such frequency in consultation practice that it would appear that reform in this direction is making slow progress. Such mixtures do little more than destroy the appetite and disgust the patient. Water, given in abun-

dance and at short intervals, is the best and only expectorant required. In cases of children about the time of crisis of pneumonia, with marked restlessness, cold extremities, and pinched features, I have seen great good result from tincture of assafœtida with whiskey toddy. As a protection to the chest during convalescence, a neatly-fitting vest made of one layer of carded wool or absorbent cotton, quilted and covered by oiled silk, should be worn upon the chest.

Purgatives.—It is probably the observation of others besides myself that purgatives administered during the stage of hepatization of a lung are bad. I have so often been called to cases made worse by the officiousness of some grandam, whose desire to purge amounted almost to insanity, that I am able to detect such interference by the collapse that has followed. I can give no explanation other than that purgatives add to the general depression at a time when the child is poorly able to withstand it. If the bowels need attention they should be moved by simple enemata.

Temperature.—The enthusiasm for the treatment of high temperatures, so popular a few years ago, has in a large measure subsided, and it may now be said that thermometric observations are less liable to plunge us into therapeutic errors than formerly. I have never participated in this "Don Quixotic" fight of temperature to the extent of allowing it to control my therapeutics, but have been content to treat hyperpyrexia alone and always in relation to other existing symptoms. In catarrhal pneumonia I am guided altogether by the respiration-rate, and in croupous pneumonia by the pulse-rate, as compared with temperature. It is exceedingly rare that I find a hyperpyrexia which does not yield to the warm bath or the warm pack, which I greatly prefer, and to the "tubing coils" known as my invention.

Some danger always attends upon the patient suddenly assuming an upright position in pneumonia, on account of the sudden strain placed upon the heart. I have more than once seen an immediately fatal result following such a procedure. Hence the preference of the pack to the bath. As I grow older in the profession and more experienced in practice I am less courageous in the use of heroic measures. I must confess to a timidity in the use of the so-called antipyretics known as the coal-tar derivatives, so highly praised by many excellent physicians. Reduction of temperature, however desirable, ought not to be purchased at the expense of deoxidation of the blood in pneumonia.

Cerebral Symptoms.—Previous to the investigations of Sternberg and Fraenkel, and the discovery of the bacillus diplococcus or pneumococcus of Friedländer, cerebral pneumonia admitted of no rational explanation. Various theories, in themselves ingenious, were made to account for the intense cephalalgia in adults, and for the initiatory convulsions of croupous pneumonia in infancy and childhood,—*e.g.*, it was at one time thought that cerebral manifestations were more frequently associated with apex consolidation, and I myself, from observation, was inclined to corroborate this statement. Professor J. Lewis Smith, recording his own valuable experience during an epidemic of cerebro-spinal meningitis in 1872 in New York City, makes special mention of the great increase in the number of cases of croupous pneumonia prevailing at the time. He evidently recognizes a pneumonic form of cerebro-spinal fever. I have many times witnessed the recession of typical cerebro-spinal symptoms *pari passu* with the development of consolidation of the lung. In infancy these cerebral symptoms, marked by convulsions and vomiting, are so common an accompaniment of croupous pneumonia that one is never warranted in pronouncing upon meningitis without a careful examination of the chest. I am convinced that nothing but clinical experience will prevent the young practitioner from making this serious error, so completely do the brain-symptoms overshadow those of the pneumonia. In etiology, however, they do not differ from the symptoms produced by the alkaloidal products of micro-organisms (toxalbumins) in other diseases circulating in the blood,—*e.g.*, scarlatina, small-pox, measles, and typhoid fever. So soon as the characteristic lesion of these diseases becomes established, these so-called brain-symptoms subside as rapidly as they came. With this etiology it is scarcely possible that one will be found administering drastic cathartics or applying leeches to the scalp. Bromides and chloral are also of doubtful propriety. The warm bath, the warm wet-pack to the chest, and tubing-cap to the head, are almost certainly followed by relief, quiet sleep, and by reduction of temperature, which is also a factor in disturbances of the nerve-centres by no means to be lost sight of in our therapeutics.

Crisis.—So long ago as 1880, in my lectures, I stated that the sudden and remarkable change which occurs usually from the fifth to the seventh day, and which is known as crisis, must have some other explanation than the subsidence of inflammation; auscultation and percussion so

frequently revealed no improvement which could reasonably account for such a change. For days after convalescence was established the local lesion could be readily demonstrated.

The study of the micrococcus pneumoniæ crouposæ and its product, pneumotoxin, has led to the discovery of a so-called antipneumotoxin, supposed by the celebrated German scientists Klemperer and brother to be antidotal to the former. The opening of this window of truth certainly throws a flood of light into this dark recess. Should the fond expectations of these earnest investigators prove true, your patience will not be burdened in future by lengthy papers upon the therapeutics of pneumonia. The sick will be made to cure the sick, and the physician, armed with his hypodermic syringe, will act as a mediator between the two. Unfortunately, however, for all these beautiful theories which, comet-like, dart across the medical sky, dazzling our vision, they are soon lost below the horizon, leaving us "to darkle in the trackless void."

In diseases which secure an immunity against a subsequent attack we have a right to expect much from inoculation. Pneumonia, so far from securing exemption from future attacks, predisposes to them, and this has been the observation of physicians from time immemorial the world over. I have in my practice a patient who has had croupous pneumonia seven times in six years, and whose life has been in jeopardy several times.

THE CLASS OF CASES IN WHICH WE MAY EXPECT GOOD RESULTS FROM EXCISION OF THE MEMBRANA TYMPANI AND OSSICLES.

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THE history of excision of the membrana tympani and ossicles has been brought to the notice of the profession so frequently that a repetition of these familiar facts would prove tiresome and uninteresting. We should, however, mention the fact that Kessel in 1875 and Schwartze in 1885 performed this operation for the relief of *deafness only;* while great credit is due to Sexton, who, in 1886, by his courage and skill, brought before the medical world the results of his numerous operations for the cure of *chronic aural discharges*, and later for the relief of deafness. It was Sexton, therefore, who first proposed this operation, and performed excision of the membrana tympani and ossicles for the cure of discharge from the ear.

Burnett and others, however, soon followed, and by publishing their results did much to establish this formerly-condemned operation and bring it to the almost universal recognition of that part of the profession especially interested in aural surgery.

We are all familiar with the determined opposition this reasonable operation called forth from some quarters. It did, indeed, seem peculiar that advocates of rational medicine should have offered such strong and damaging protests against a surgical procedure which they could not but acknowledge was based on *sound surgical principles;* and especially did this opposition appear unreasonable when we remember that these same opponents were acquainted with many unfortunate patients suffering from a chronic discharging ear with its many dangers, which had not only resisted *their* every effort, but had, moreover, baffled the skill of other specialists.

The great danger to life arising from a suppurative disease of the middle ear is now admitted by all, and surely any procedure proposed for its relief is worthy of due and proper consideration, so long as the treatment thus suggested is not likely to produce bad results, and has for its support the same sound anatomical, pathological, and physiological backing that has characterized all the noted advances of modern surgery.

Those who have not taken kindly to this rational treatment have declared the operation to be dangerous, and therefore involving too many risks to admit of its becoming popular; to all of which we would ask whether this or any other proper surgical procedure could be more of a daily menace to life than a chronic discharge from a cavity the walls of which are composed of plates of bone that are extremely thin and surrounded by such vital parts as the brain and important blood-vessels? It is certain that a continuation of the discharge favors necrosis of these delicate plates of bone, and thereby induces, through continuity of structure or by direct communication, abscess of the mastoid, septic inflammation of the brain-substance and its coverings, or *cerebral abscess*, from which alone there are annually dying in the United States probably four thousand of her inhabitants.

At present it is difficult to say precisely just what class of cases are most likely to yield good results from this mode of treatment. Some few

cases, regardless of the duration of tinnitus and vertigo or the degree of deafness, will give very satisfactory results. As a general rule, however, it is not well to expect too much improvement of hearing from a chronic, non-suppurative otitis media; and yet, in this class of cases, where tinnitus, pain, and vertigo are urgent symptoms, and have resisted other methods of treatment, we should not hesitate to suggest the removal of the membrana tympani and one or more of the ossicles for their relief. It has not been our custom in the non-suppurative cases to excise the entire membrana tympani unless it is greatly thickened, opaque, and firmly adherent to the tympanic walls. In this class of cases it is interesting to note the large number of patients in which the tympanic membrane presents quite a healthy appearance. It is, however, in just such cases that we remove only sufficient membrane to enable us to excise the malleus, the incus, or both.

In this modified operation it is very unusual to have any reaction, and we likewise avoid the pain and suppuration that has at times been reported. By this partial myringectomy, regeneration of the membrane is so slow that at present we can recall at least seven cases in which the original opening has remained for more than two years. Moreover, in our experience of over two hundred patients operated on, we are convinced that it is seldom necessary to remove the membrana tympani after regeneration has occurred, unless, of course, the operation had been performed in one of the suppurative cases, and where regeneration of the membrane had confined a dangerous necrosis of the tympanic cavity, or concealed a threatened mastoid involvement.

In order to obtain good results in the suppurative cases, we believe it to be positively essential to remove every fragment of the membrane, as this is the *only* way in which we can hope to obtain free drainage and procure an opening through which to properly treat the diseased cavity.

If the attic is involved it will be found necessary to excise both the malleus and incus, for these bones are very susceptible to carious degeneration, and where either is left behind, the suppuration is almost sure to continue; and even if the discharge should cease, it is likely to reappear at any time in the future.

In regard to the operation for excision of the stapes, which has met with such good results in the hands of Dr. Jack, of Boston, I can say but little, as my experience with this operation is limited to two cases; both of these, however, were somewhat successful in the relief of symptoms that have otherwise resisted treatment; but as each of these cases suffered from prolonged staggering vertigo as sequela of the operation (possibly due to my lack of skill), and as out-patients have generally recovered without this procedure, we have found no indication for advising or performing this more formidable operation.

In order to show the benefit that is sometimes obtained from apparently the most hopeless condition, we will review the detailed history of several unique cases, characterized by marked deafness, severe pain, and vertigo, all of which were relieved by operation.

Case I.—J. K., thirty-nine years, began to lose his hearing, accompanied by an itching of the external auditory canal, ten years ago. This loss of hearing was in both ears, and continued to grow worse until eighteen months ago, when he was suddenly taken with severe pain in each ear, radiating over the entire head. This pain continued without interruption for nine months; then, without apparent cause, the pain increased in such violence as to necessitate his going to bed and summoning a physician. Before relief could be obtained he became totally deaf in the left ear. At the end of two weeks the pain was so much better as to enable him to leave his bed. Some pain, however, has continued, and now seems to be confined to the right ear. On January 10, 1893, he consulted the writer (bringing a note from the family physician, to whom I am indebted for his previous history).

It is well to state that this patient has never had any discharge from the ear, nor does he remember having had at any time an injury to his head. Except for the inflammation extending along the manubrium, nothing of any importance could be seen to account for his suffering. The mastoid region presented a healthy appearance; the drum, however, was much retracted and firmly adherent to the promontory. His hearing-power was *nil* through aerial conduction of sound. Bone conduction was about three-fourths normal.

With the hope of relieving the pain alone, we suggested the removal of the drum and ossicles. On January 16, 1893, under ether, in the hands of Dr. Pontius, we removed the drum by the circular incision and extracted the malleus and incus in a piecemeal way, their vitality having been so completely destroyed by the process of necrosis that they crushed to powder under the slight pressure of a delicate pair of forceps. These bones had undergone the several changes which are more forcibly than elegantly expressed by the term "dry rot." I

believe this was the first and only case in the writer's experience where complete excision of the drum was accomplished without any hemorrhage, After operation the tympanum and canal were lightly packed with iodoform cotton and the patient kept quietly in bed. For three days the pain was in no way relieved, although the hearing was materially improved. From the third day, however, the pain and tinnitus grew less, while the hearing-power continued to increase.

On January 24, or eight days following the operation, the pain and tinnitus were so slight as to be barely noticeable. Could hear loud conversation at three feet; tuning-fork and watch were negative in result.

March 12, or about two months after the operation, reports that he has been free from pain and almost free from tinnitus for two weeks. Hearing-power slightly improved.

May 16, has not had pain since six weeks following the operation, and the tinnitus is now so slight as not to annoy him. Thinks it is growing less each day. Can hear ordinary conversation at six and a half feet, fork and watch each at four and a half inches.

It is difficult to say why this man should have suffered so severely, for surely the condition as above narrated does not seem to be a sufficient explanation. As regards tinnitus and loss of hearing, we consider this to be fully explained in expressing the belief that a thick drum bound down by adhesions, with anchylosis or other disease of the ossicles, acts as a foreign body, and as such produces tinnitus and deafness, the degree of which is in direct ratio to the extent of the disease present, and consequent interference with their normal function. We would, therefore, consider the removal of such disturbing foreign elements as not only sufficient reason for the partial or complete restoration of hearing, but it can also be hoped for and reasonably expected that we may secure relief from distressing tinnitus and ofttimes dangerous vertigo.

Case II.—A. M., aged sixteen, applied for treatment August 10, 1890. When seven years old had scarlet fever. This was followed by discharge from both ears, which was continuous until the above date. Meanwhile, was progressively and rapidly losing her hearing. Suffered continuous pain, sometimes very severe; was totally deaf in left ear. After making many and various unsuccessful efforts to arrest the discharge and relieve pain, we suggested the removal of the fragment of drum and malleus. This we performed on December 9, 1890, after which the ear was packed with iodoform cotton, and replaced by fresh cotton every one or two days.

December 20.—No discharge since operation; hears fork at five inches, watch at three inches, ordinary conversation at three feet.

January 26, 1891.—Tympanum entirely dry; hears fork at five inches, watch at six inches, ordinary conversation at five feet.

April, 1891.—No discharge since operation; hears watch at six inches, fork at seven inches, ordinary conversation at twelve feet.

December, 1891.—Slight improvement over the above.

July, 1892.—Hears watch at $\frac{10}{60}$, fork at twelve inches, ordinary conversation at fourteen feet.

May 24, 1893, or two and a half years after operation, hears watch at $\frac{16}{60}$, fork at seventeen inches, ordinary conversation at twenty-seven feet; no discharge since date of operation; health much improved; performs the duties of life quite as well as if she had never been deaf or suffered from pain in that ear.

Case III.—H. D., sixty-two years old, applied March 10, 1893. Six years ago resided in England, at which time was taken with a severe pain in the right ear, which she thinks came from cold. Never had any ear-trouble before, and has always enjoyed good health. Was treated by physicians in England for three years, but received no benefit. Has been in this country for three years, and undergone treatment at the hands of many physicians and as a private patient at several hospitals, without beneficial results.

On March 10 last, or three months ago, she consulted the writer at the Jefferson Hospital, suffering extreme pain and greatly annoying tinnitus in the head. Never had a discharge from the ear, but has suffered from severe headache since early adult life.

The drum and external auditory canal, on examination, revealed nothing abnormal, except some inflammation covering the manubrium. The Eustachian tube was somewhat swollen, but inflation of the tympanum by Politzer's method was easily accomplished. This interference, however, gave her some increase of pain. By aerial conduction of sound she could hear only very loud conversation; watch and tuning-fork could not be heard; bone conduction, however, was quite normal. Aside from operative interference it was difficult to suggest or carry out a line of treatment with any reasonable prospect of securing relief, and inasmuch as she had undergone much treatment of the usual routine kind without in any way being benefited, we felt justified in

suggesting excision of the drum and malleus, which was performed on March 30, 1893.

For one week following operation she continued to suffer some pain, but it was markedly less severe. On the tenth day a slight discharge of pus was noticed, at which time the pain entirely ceased. The discharge became quite copious three days later. Sixteen days after operation the discharge was quite scanty and the pain returned. A free discharge, however, was re-established, and the pain again ceased, not to return again.

April 30, 1893.—Pain relieved; discharge entirely gone; heard the fork at one inch, watch at $\frac{3}{10}$; ordinary conversation at six feet.

May 10, 1893.—Tympanum entirely dry; no pain; hears watch at $\frac{20}{10}$, fork at nine inches; ordinary conversation can be heard at the normal distance. Patient expresses herself as feeling entirely well; hears everything at church or opera.

CASE IV.—E. M., thirty-nine years old; first seen January 15, 1893. When four years old had a severe illness, which was followed by a discharge in both ears. This continued until eighteen years old, when the discharge ceased in each ear. Two years later she suffered from severe pain in the left ear for one week, when the drum ruptured, followed by the free escape of pus and relief from pain. The running continued for some weeks, then ceased, since which time she has been free from discharge or inconvenience of any kind until two years ago, when her hearing began to fail, accompanied by some "neuralgic pain" in head and distressing tinnitus. Is now totally deaf to aerial conduction of sound, the osseous conduction being quite normal.

After making unsuccessful efforts for her relief, I advised the removal of the ossicles and drum of the left ear, which we did on March 20, 1893. The operation was followed by considerable discharge for several days, but the hearing began to improve almost immediately and the tinnitus to grow less. The pain has been entirely relieved.

May 18, 1893.—Pain and tinnitus entirely relieved; hears tuning-fork at ten inches, watch at $\frac{4}{10}$, ordinary conversation at two feet; general health, which had been very poor before operation, is greatly improved; discharge has entirely ceased; tinnitus and pain effectually relieved.

CASE V.—F. B., aged twenty-five, consulted me September 21, 1889. In 1887 I had treated the sister of this patient for impairment of hearing, due to impacted wax; and, as she was impressed with the idea that something unusually skilful had been done for her, she informed me of a sister living in Breslau, Germany, who had bean deaf from early childhood, and suggested that possibly we might be able to give her relief. She was advised to send for her sister, who presented herself about two years later, giving the following history: Has suffered pain ever since she was old enough to remember. At times it was so severe as to necessitate her going to bed, and could only be relieved by the hypodermic injection of morphine. This pain was not confined to the ears, but seemed to be general over the entire head. Does not remember ever having had discharge from the ears. Noises in the head, of almost every character, were very severe and caused her great annoyance. She expressed herself as being entirely satisfied if she could be relieved of the pain and tinnitus, as she had given up all hope of ever hearing again. She claims to have been treated without success in Berlin, Vienna, Dublin, and London, and to have had a "nerve cut" three different times with the hope of securing relief from the severe pain.

On examination we found the external auditory canal in each ear somewhat obstructed by an accumulation of inflammatory products, and very painful to the touch. The drum of each ear was congested, markedly thickened, and so much retracted as to be immovably adherent to the promontory. We found the Eustachian tube obstructed, which, however, promptly yielded to treatment, but without improving the hearing to any appreciable extent. On careful examination of the hearing-power, she proved to be totally deaf to all sounds, regardless of their pitch or character. The osseous conduction of sound, however, was perfect. Of course, the history and unfavorable results of the examination, except for the good bone conduction, compelled us to regard any hopes of improvement in hearing as improbable. However, feeling it our duty to at least make an effort to relieve the pain and tinnitus, we concluded to remove the drum and one or more ossicles, as might be necessary. Accordingly, on October 3, 1889, we excised the drum and ossicles of the left ear. The patient positively refused to take an anæsthetic of any kind, because a relative had died under its use. This was the first case of this character that I have ever done under cocaine. The pain was quite severe during the operation, but being a woman of determination and pluck, she stood her suffering very well. The malleus and incus both showed evidences of necrosis, particularly

			Discharge.							Hearing-power.				Results of operation.				Hearing-power.						
No.	Age.	Sex.	Continuous.	Recurrent.	Duration.	Tinnitus.	Pain.	Vertigo.	Ear.	Voice.	Tuning-fork.	Watch.	Bone construction.	Discharge.	Pain.	Tinnitus.	Vertigo.	Voice.	Tuning-fork.	Watch.	Time since operation.	Cause of disease.	Operation.
1	16	M.	Yes.	No.	12 yrs.	No.	No.	No.	L.	Loud 2 ft.	Negative.	No.	Normal.	No.	No.	No.	No.	O. C. 19 ft.	11 in.	$\frac{18}{20}$	3 yrs.	Scarlet fever.	Mal. and inc.
2	24	F.	No.	Yes.	9 "	Yes.	Yes.	Yes.	"	No.	No.	"	"	"	"	"	"	" 4 "	3 "	$\frac{7}{20}$	10 mos.	Not known.	"
3	36	"	Yes.	No.	19 mos.	Severe	No.	No.	"	"	"	"	$\frac{1}{2}$ "	"	"	"	"	" 21 "	16 "	$\frac{17}{20}$	4 yrs.	La grippe.	"
4	9	"	No.	Yes.	7 yrs.	No.	"	"	R.	O. C. 1 "	"	"	$\frac{3}{4}$ "	"	"	"	"	" 10 "	5 "	$\frac{5}{20}$	7 mos.	Measles.	"
5	81	M.	"	No.	No.	Severe	Severe	Yes.	Both	No.	"	"	$\frac{1}{2}$ "	"	"	"	"	" 11 "	7 "	$\frac{13}{20}$	3½ yrs.	Not known.	"
6	7	F.	Yes.	"	2 yrs.	No.	No.	No.	"	O. C. 2 "	"	"	" "	"	"	"	"	" 6 "	9 "	$\frac{8}{20}$	1 yr.	Scarlet fever.	"
7	18	"	No.	Yes.	13 "	Yes.	Yes.	"	"	" 3 in.	"	"	$\frac{3}{4}$ "	"	"	Slight.	"	" 15 "	12 "	$\frac{18}{20}$	16 mos.	"	"
8	14	"	Yes.	No.	2½ "	No.	No.	"	R.	" 1 ft.	2 in.	"	" "	"	"	No.	"	" 10 "	5 "	$\frac{10}{20}$	2 yrs.	La grippe.	Incus.
9	7	M.	No.	Yes.	4½ "	"	Yes.	"	"	" 1 "	1 "	$\frac{1}{20}$	" "	"	"	"	"	" 16 "	8 "	$\frac{13}{20}$	3 "	Scarlet fever.	"
10	52	F.	"	No.	.....	Severe	No.	Severe	Both	L. C. 1 "	No.	No.	Slight.	"	"	Slight improvement.	"	" 2 "	No.	No.	2½ "	Not known.	Mal. and inc.
11	12	"	Yes.	"	2 yrs.	No.	"	No.	R.	O. C. 2 "	1 in.	$\frac{1}{20}$	Normal.	"	"	No.	"	" 12 "	4 in.	$\frac{7}{20}$	4 "	La grippe.	"
12	12	M.	"	"	3 "	"	"	"	"	" 2½ "	½ "	$\frac{1}{20}$	"	"	"	"	"	" 18 "	9 "	$\frac{18}{20}$	3½ "	"	Malleus.
13	54	"	"	"	3 "	Yes.	"	Yes.	"	" 1 "	No.	No.	"	"	"	"	"	" 26 "	16 "	$\frac{18}{20}$	" "	"	Incus.
14	45	"	No.	Yes.	7 "	Severe	Severe	Severe	L.	" 3 "	"	"	"	"	"	"	"	" 5 "	9 "	$\frac{11}{20}$	4 "	"	"
15	80	"	...	...	.....	30 yrs. severe.	No.	20 yrs. severe.	Both	Very L. 1 ft.	"	"	½ "	"	"	"	"	" 4 "	2 "	$\frac{5}{20}$	3½ "	Not known.	Inc. and mal., drum intact.
16	53	F.	...	...	.....	10 yrs. severe.	"	3 yrs. severe.	"	O. C. 3 ft.	"	"	" "	"	"	Slight.	"	" 2 "	1 "	$\frac{2}{20}$	" "	"	"
17	62	"	...	...	.....	2 yrs. severe.	"	2 yrs.	"	" ½ "	"	"	¾ "	"	"	No.	"	" 2 "	4 "	$\frac{5}{20}$	2¾ "	"	"
18	49	M.	...	...	.....	Severe	"	7 mos.	"	" 7 in.	"	"	"	"	"	"	"	" 12 "	7 "	$\frac{5}{20}$	1 "	"	"
19	57	F.	...	...	.....	Yes.	"	3 "	"	" 7 "	"	"	"	"	"	Slight.	"	" 12 "	0 "	$\frac{0}{20}$	3½ "	"	"
20	71	M.	...	...	.....	Severe	"	14 yrs.	"	" 2 ft.	"	"	¾ "	"	"	"	"	" 16 "	3 "	$\frac{13}{20}$	" "	"	"
21	39	"	...	...	.....	Yes.	"	5 "	"	" 4 "	2 in.	"	"	"	"	"	"	" 9 "	11 "	$\frac{16}{20}$	1½ "	La grippe.	"
22	29	"	...	...	.....	2 yrs. severe.	Slight.	3 "	"	" 6 "	3 "	"	"	"	"	"	"	" 6 "	7 "	$\frac{3}{20}$	1 "	"	"
23	47	"	...	...	.....	"	No.	6 "	"	" 13 "	No.	"	"	"	"	No.	"	" 16 "	5 "	$\frac{5}{20}$	2½ "	Not known.	"
24	55	"	...	...	.....	Yes.	"	12 "	"	" 3 "	2½ in.	"	"	"	"	"	"	" 24 "	4 "	$\frac{5}{20}$	2 "	"	"
25	57	"	...	...	.....	"	"	4 "	"	" 3 "	No.	"	"	"	"	"	"	" 21 "	17 "	$\frac{5}{20}$	3 "	"	"
26	48	"	...	...	.....	12 yrs. severe.	"	2 "	L.	No.	"	"	"	"	"	But little improved.	Little improvement.	" No.	No.	No.	6 mos.		"
27	37	F.	...	...	.....	Yes.	"	1 "	Both	O. C. 6 "	"	3 in.	"	"	"	Slight.	No.	" 12 ft.	4 in.	$\frac{5}{20}$	7 "	"	"
28	35	M.	...	...	.....	"	.....	3 "	L.	" 3 "	2 in.	No.	"	"	"	"	"	" 19 "	7 "	No.	9 "	"	"

29	53	M.	...	...	.....	Yes.	.....	4 "	"	" 3 "	3 "	"	"	"	"	No.	"	" 5 "	7½ "	1/8	13 "	"	"
30	46	F.	...	...	.....	"	.....	3 "	Both	" 7 "	4 "	"	"	"	Slight.	"	"	" 12 "	6 "	1/10	5 "	"	"
31	42	"	...	...	.....	"	.....	2 "	"	" 9 "	7 "	7 in.	"	Slight.	"	"	"	" 25 "	9 "	1/17	8 "	"	"
32	31	M.	...	...	.....	"	.....	9 "	"	" 9 "	6 "	2 "	"	No.	"	"	"	" 31 "	11 "	1/18	16 "	"	"
33	36	"	...	...	.....	"	.....	1 "	L.	" 9 "	2 "	No.	"	"	"	Slight.	Slight.	" 12 "	9 "	1/18	9 "	"	"
34	43	"	...	...	.....	"	.....	Yes.	"	" 8 "	1 "	2 in.	"	"	"	No.	"	" 10 "	12 "	1/20	"	"	"
35	62	F.	...	...	.....	"	.....	"	R.	" 7 "	4 "	4 "	"	"	"	"	"	" 13 "	11 "	1/20	6½ "	"	"
36	48	M.	...	...	.....	"	.....	"	"	" 12 "	3 "	No.	"	"	"	"	"	" 27 "	7 "	1/18	7 "	"	"
37	43	F.	...	...	.....	"	.....	"	"	" 6 "	2 "	"	"	"	"	"	"	" 9 "	8 "	1/20	16 "	"	"
38	57	"	...	...	.....	"	.....	2 yrs.	"	" 4 "	3 "	"	"	"	"	"	No.	" 3 "	1 "	1/20	3 "	"	"
39	56	"	...	...	.....	"	.....	No.	L.	" 4 "	½ in.	"	"	"	"	"	"	" 9 "	2 "	No.	2½ "	"	"
40	47	M.	...	...	.....	"	.....	"	"	" 3 "	1 in.	"	"	"	"	"	"	" 7 "	4 "	1/20	18 "	"	"
41	64	"	...	...	.....	"	No.	"	"	" 5 "	2½ in.	"	"	"	"	"	"	" 12 "	1 "	1/18	20 "	"	"
42	48	"	...	...	.....	"	"	1 yr.	R.	" 6 "	3 in.	"	"	"	"	"	"	" 11 "	2 "	1/20	19 "	"	"
43	47	"	...	...	.....	"	"	2 yrs.	L.	" 7 "	1 "	"	"	"	"	"	"	" 26 "	13 "	1/20	19 "	"	"
44	53	"	...	...	.....	"	"	3 "	"	" 3 "	4 "	1/20	"	"	"	"	"	" 3 "	3 "	1/20	19 "	"	"
45	32	F.	...	...	.....	"	"	No.	"	" 11 "	3 "	1/20	"	"	"	"	"	" 11 "	7 "	1/20	3 yrs.	"	"
46	34	M.	...	...	.....	"	"	"	"	" 10 "	1 "	1/20	"	"	"	"	"	" 20 "	9 "	1/20	2½ "	"	"
47	39	"	...	...	.....	"	"	"	Both	" 7 "	4 "	1/20	"	"	"	"	"	" 21 "	5 "	1/20	4 "	"	"
48	35	F.	...	...	.....	"	"	"	L.	" 5 "	2 "	1/20	"	"	"	"	"	" 9 "	17 "	1/20	2½ "	"	"
49	47	M.	...	...	.....	"	"	3 yrs.	R.	" 13 "	7 "	1/20	"	"	"	"	"	" 19 "	13 "	1/18	3 "	"	"
50	64	F.	...	...	.....	"	"	1 "	"	" 4 "	1 "	No.	"	Slight.	"	Slight.	"	" 27 "	5 "	1/10	9 mos.	"	"
51	47	"	...	...	.....	"	"	4 "	"	" 3 "	2 "	1/20	"	No.	No.	No.	"	" 3 "	2 "	1/20	9 "	"	"
52	54	M.	...	...	.....	"	"	12 "	L.	" 1 "	No.	No.	"	"	"	"	"	" 4 "	3 "	1/10	13 "	"	"
53	45	"	...	...	.....	"	"	19 "	Both	" 1 "	"	"	"	"	"	"	"	" 4 "	3 "	No.	7 "	"	"
54	57	"	...	...	.....	"	"	7 "	"	" 2 "	"	"	"	"	"	"	"	" 5 "	2 "	"	4 "	"	"
55	62	"	...	...	.....	20 yrs. severe.	"	15 yrs. severe.	"	L. C. 1 "	"	"	"	¾ " ½ "	"	"	Slight.	" 7 "	4 "	"	4 "	"	"
56	53	"	...	...	.....	Yes.	"	Yes.	L.	O. C. 3 "	3 in.	1/20	"	"	"	"	"	" 2 "	3 "	1/20	11 "	"	"
57	43	"	...	...	.....	"	"	"	R.	" 3 "	4 "	1/20	"	"	"	"	No.	" 9 "	9 "	1/20	12 "	"	"
58	39	F.	...	...	.....	"	"	"	"	" 4 "	5 "	1/20	"	"	"	"	Slight.	" 12 "	8 "	1/20	9 "	"	"
59	40	"	...	...	.....	"	"	"	"	" 12 "	8 "	1/20	"	"	"	Yes.	"	" 16 "	9 "	1/18	7 "	"	"
60	46	"	...	...	.....	"	"	"	L.	" 9 "	4 "	1/20	"	"	"	"	No.	" 20 "	12 "	1/20	16 "	"	"
61	54	"	...	...	.....	"	"	"	"	" 11 "	9 "	No.	"	"	"	No.	"	" 9 "	9 "	1/10	3 "	"	"
62	38	M.	...	...	.....	"	"	Slight.	"	" 7 "	1 "	"	"	½ "	"	"	Slight.	Slight.	" 6 "	1 "	"	2 yrs.	"	"
63	63	F.	...	...	.....	"	"	Yes.	Both	" 7 "	3 "	"	"	"	"	"	"	" 8 "	2 "	No.	1 "	"	"
64	42	M.	...	...	.....	"	"	"	R.	" 5 "	2½ in.	"	¾ "	"	"	"	"	" 5 "	1 "	"	3 "	"	"
65	47	"	...	...	.....	"	"	Slight.	"	" 12 "	1 in.	"	"	"	"	"	Not much improved.	" 11 "	2 "	"	7 mos.	"	"
66	51	"	...	...	.....	"	"	"	L.	" 1 "	3 "	"	"	"	"	No.	"	" No.	2 "	"	12 "	"	"
67	50	"	...	...	.....	"	"	"	R.	" 1 "	1 "	"	½ "	"	"	Slight.	"	" No.	No.	"	3 "	"	"
68	57	"	...	...	.....	"	"	"	"	" 2 "	2 "	1/20	"	"	"	No.	No.	" 2 ft.	2 in.	1/20	3 "	"	"
69	48	F.	...	...	.....	"	"	"	"	" 3 "	2 "	1/20	¾ "	"	"	"	"	" 4 "	4 "	1/20	4 "	"	"
70	49	M.	...	...	.....	"	"	No.	L.	" 4 "	1 "	1/20	"	"	"	"	"	" 3 "	3 "	1/20	8 "	"	"
71	39	F.	...	...	.....	"	"	"	"	" 4 "	4 "	1/20	"	"	"	"	"	" 6 "	4 "	1/20	10 "	"	"
72	33	"	...	...	.....	"	"	"	R.	" 2 "	3 "	1/20	"	"	"	Slight.	"	" 4 "	4 "	1/20	14 "	"	"
73	41	"	...	...	.....	"	"	"	"	" 2 "	5 "	1/20	"	"	"	"	"	" 8 "	7 "	1/20	18 "	"	"
74	44	M.	...	...	.....	"	"	"	"	" 4 "	2 "	1/20	"	"	"	"	"	" 7 "	2 "	1/20	9 "	"	"
75	38	F.	...	...	.....	"	"	Yes.	"	" 4 "	1 "	No.	"	"	"	No.	"	" 4 "	2 "	1/20	3 yrs.	"	"

No.	Age.	Sex.	Discharge.							Hearing-power.				Results of operation.				Hearing-power.					
			Continuous.	Recurrent.	Duration.	Tinnitus.	Pain.	Vertigo.	Ear.	Voice.	Tuning-fork.	Watch.	Bone construction.	Discharge.	Pain.	Tinnitus.	Vertigo.	Voice.	Tuning-fork.	Watch.	Time since operation.	Cause of disease.	Operation.
76	61	M.	...	...	.....	Yes.	No.	Yes.	L.	O. C. 4 ft.	2 in.	$\frac{1}{10}$	Normal.	No.	No.	No.	No.	O. C. 4 ft.	2 in.	No.	2½ yrs.	Not known.	Mal. and inc., drum intact.
77	58	"	...	...	.....	"	"	No.	"	" 3 "	1 "	$\frac{5}{10}$	"	"	"	"	Slight.	" 6 "	4 "	"	11 mos.	"	"
78	59	F.	...	...	.....	"	"	"	"	" 6 "	1 "	$\frac{1}{10}$	"	"	"	"	No.	" 12 "	5 "	$\frac{5}{10}$	3 yrs.	"	Mal. and inc.
79	49	"	...	...	.....	"	"	"	R.	" 2 "	1 "	No.	½ "	"	"	"	Slight.	" 1 "	2 "	$\frac{5}{10}$	1 "	"	"
80	44	"	...	...	.....	"	"	Yes.	L.	" 3 "	3 "	"	"	"	"	"	"	" 8 "	4 "	No.	2 "	"	"
81	35	M.	...	...	.....	"	"	"	R.	" 4 "	2 "	"	" "	"	"	Slight.	"	" 8 "	3 "	"	2 "	"	Inc., drum intact.
82	64	"	...	...	.....	10 yrs. severe.	"	9 yrs. severe.	Both	L. C. 1 "	No.	"	" "	"	"	No.	"	" 1 "	½ "	"	3 "	"	"
83	74	"	...	...	.....	12 yrs. severe.	"	4 yrs. severe.	"	" 2 "	"	"	¾ "	"	"	"	No.	" 9 "	9 "	$\frac{5}{10}$	12 mos.	"	Mal. and inc., drum intact.
84	67	"	...	...	.....	9 yrs. severe.	"	3 yrs. severe.	"	" 1 "	"	"	½ "	"	"	"	Slight.	" 12 "	8 "	$\frac{5}{10}$	9 "	"	"
85	4	F.	Yes.	...	1 yr.	No.	"	No.	"	O. C. 8 "	2 in.	"	"	"	"	Yes.	"	" 16 "	9 "	$\frac{1}{10}$	7 "	"	"
86	7	"	"	...	3 yrs.	"	"	"	"	" 8 "	4 "	"	"	"	"	"	No.	" 20 "	12 "	$\frac{5}{10}$	16 "	"	"
87	9	M.	"	...	2 "	"	"	"	"	" 6 "	2 "	$\frac{5}{10}$	"	"	"	No.	"	" 20 "	9 "	$\frac{5}{10}$	3 "	"	"
88	18	F.	...	Yes.	7 "	"	Yes.	"	R.	" 16 "	9 "	$\frac{1}{10}$	"	"	"	Slight.	Slight.	" 6 "	1 "	"	2 yrs.	"	"
89	4	"	Yes.	...	18 mos.	"	No.	"	"	" 1 "	4 "	No.	"	"	"	"	"	" 8 "	2 "	No.	1 "	"	"
90	5	"	"	...	" "	"	"	"	"	" 1 "	2 "	"	"	"	"	"	"	" 5 "	1 "	"	3 "	"	"
91	23	"	...	Yes.	17 yrs.	Yes.	Yes.	"	"	" 7 "	1 "	"	"	"	"	"	Not much improved.	" 11 "	2 "	"	7 mos.	"	"
92	13	"	Yes.	...	9 "	No.	No.	"	"	" 4 "	4 "	"	"	Slight.	"	No.	"	" No.	2 "	"	12 "	"	"
93	27	M.	...	Yes.	12 "	Yes.	Yes.	"	"	" 7 "	3 "	$\frac{5}{10}$	"	No.	"	Slight.	"	" "	No.	"	3 "	"	"
94	19	"	Yes.	...	18 mos.	No.	No.	"	L.	" 4 "	1 "	"	"	"	"	No.	No.	" 2 ft.	2 in.	$\frac{1}{10}$	3 "	"	"
95	28	F.	...	Yes.	11 yrs.	Yes.	Yes.	"	R.	" 3 "	1 "	No.	"	Slight.	"	"	"	" 4 "	3 "	$\frac{5}{10}$	4 "	"	"
96	22	M.	Yes.	...	6 "	No.	No.	"	"	" 9 "	3 "	$\frac{5}{10}$	"	No.	"	"	"	" 3 "	4 "	$\frac{5}{10}$	8 "	"	"
97	7	"	"	...	2 "	"	"	"	"	" 4 "	4 "	No.	"	"	Slight.	"	"	" 6 "	4 "	$\frac{5}{10}$	10 "	"	"
98	6	F.	"	...	9 mos.	"	Slight.	"	"	" 7 "	1 "	"	"	"	No.	Slight.	"	" 4 "	4 "	$\frac{5}{10}$	14 "	"	"
99	18	M.	"	...	10 "	"	No.	"	"	" 6 "	2 "	"	"	"	"	"	"	" 8 "	7 "	$\frac{5}{10}$	18 "	"	"
100	12	"	"	...	12 "	"	"	"	Both	" 12 "	7 "	"	"	"	"	"	"	" 7 "	2 "	$\frac{5}{10}$	9 "	"	"
101	4	"	"	...	9 "	"	Yes.	"	L.	" 2 "	3 "	No.	"	"	"	No.	"	" 4 "	2 "	$\frac{5}{10}$	3 yrs.	"	"
102	9	F.	"	...	2 yrs.	"	"	"	"	" 6 "	5 "	"	"	"	"	"	"	" 4 "	2 "	No.	2½ "	"	"
103	49	"	...	Yes.	20 "	Yes.	"	Yes.	"	" 1 "	No.	"	"	"	"	"	Slight.	" 6 "	4 "	"	11 mos.	"	"
104	27	"	...	"	17 "	"	"	"	R.	" 2 "	"	"	"	"	"	"	No.	" 12 "	5 "	$\frac{5}{10}$	3 yrs.	"	Mal. and inc.
105	12	M.	Yes.	...	4 "	No.	No.	No.	"	" 4 "	4 in.	$\frac{5}{10}$	"	"	"	"	Slight.	" 1 "	2 "	$\frac{5}{10}$	1 "	"	"
106	14	F.	"	...	4 "	"	"	"	"	" 8 "	7 "	"	"	"	"	"	"	" 8 "	4 "	No.	2 "	"	"
107	26	M.	"	...	3 "	"	"	"	"	" 3 "	5 "	$\frac{5}{10}$	"	"	"	Slight.	"	" 8 "	3 "	"	2 "	"	Inc., drum intact.
108	32	"	"	Yes.	24 "	Yes.	Yes.	Yes.	Both	" 1 "	No.	$\frac{1}{10}$	"	"	"	No.	"	" 1 "	½ "	"	3 "	"	"

109	19	F.	...	...	1 "	No.	No.	No.	"	"	9 "	5 in.	3/10	"	"	"	"	No.	" 1 "	1 "	"	3 "	"	"
110	7	M.	Yes.	Yes.	2 "	"	"	"	"	"	12 "	8 "	3/10	"	"	"	Slight.	"	L. C. 3 "	1½ "	"	3 "	"	"
111	28	F.	"	"	16 "	Yes.	"	"	L.	"	4 "	2 "	3/10	"	Slight.	"	No.	"	O. C. 7 "	4 "	3/10	12 mos.	Scarlet fever.	Drum, mal. and inc.
112	22	M.	"	...	9 "	No.	"	"	"	"	6 "	3 "	3/10	"	No.	"	"	"	" 7 "	3 "	1/10	4 "	"	"
113	31	"	...	Yes.	12 "	Yes.	"	"	"	"	3 "	1 "	3/10	"	Slight.	"	"	"	" 12 "	3 "	3/10	8 "	"	"
114	26	"	...	"	12 "	"	"	"	R.	"	8 "	7 "	3/10	"	No.	"	"	"	" 27 "	11 "	3/10	2 yrs.	"	"
115	18	F.	Yes.	...	4 "	No.	"	"	"	"	6 "	9 "	3/10	"	"	"	"	"	" 12 "	5 "	1/10	4 "	"	"
116	24	M.	"	...	9 "	"	"	"	L.	"	3 "	2 "	3/10	"	"	"	"	"	" 12 "	12 "	3/10	4 "	"	"
117	19	F.	"	...	2 "	"	"	"	Both	"	6 "	1 "	No.	"	"	"	"	"	" 18 "	4 "	3/10	3 "	Measles.	"
118	12	"	"	...	1 "	"	"	"	L.	"	11 "	1 "	"	"	"	"	"	"	" 12 "	9 "	3/10	2 "	Scarlet fev.	"
119	14	"	"	...	3 "	"	"	"	"	"	7 "	3 "	3/10	"	"	"	"	"	" 9 "	7 "	1/10	1 "	"	"
120	11	"	"	...	6 "	"	"	"	Both	"	7 "	1 "	No.	"	"	"	"	"	" 7 "	9 "	"	18 mos.	"	"
121	7	M.	"	...	5 "	"	"	"	"	"	3 "	1 "	"	"	"	"	"	"	" 6 "	4 "	3/10	13 "	"	"
122	5	F.	"	...	2 "	"	"	"	"	"	2 "	2 "	"	"	"	"	"	"	" 4 "	2 "	"	10 "	"	"
123	6	"	"	...	1½ "	"	"	"	"	"	8 "	2 "	"	"	"	"	"	"	" 18 "	5 "	1/10	11 "	"	"
124	8	M.	"	...	2 "	"	"	"	"	"	1 "	1 "	"	"	"	"	"	"	" 2 "	4 "	1/10	8 "	Diphtheria.	Drum and malleus.
125	11	"	"	...	2 "	"	"	"	R.	"	3 "	3 "	3/10	"	"	"	"	"	" 3 "	8 "	3/10	18 "	Scarlet fev.	"
126	16	F.	"	...	18 mos.	Yes.	"	"	"	"	3 "	4 "	3/10	"	"	"	"	"	" 10 "	4 "	3/10	13 "	"	"
127	10	"	"	...	11 "	No.	"	"	"	"	4 "	2 "	3/10	"	"	"	"	"	" 8 "	3 "	3/10	3 yrs.	"	"
128	8	"	"	...	16 "	"	"	"	L.	"	2 "	1 "	3/10	"	"	"	"	"	" 3 "	6 "	3/10	2 "	"	"
129	6	M.	"	...	22 "	"	"	"	R.	"	1 "	6 "	3/10	"	"	"	"	"	" 2 "	12 "	1/10	9 mos.	"	"
130	10	F.	"	...	23 "	Yes.	"	"	L.	"	1 "	4 "	No.	"	"	"	"	"	" 3 "	6 "	1/10	6 "	"	"
131	13	M.	"	...	3 yrs.	No.	"	"	"	"	4 "	1 "	"	"	"	"	"	"	" 5 "	4 "	3/10	13 "	"	"
132	5	"	"	...	8 mos.	"	"	"	"	"	8 "	1 "	"	"	"	"	"	"	" 9 "	2 "	3/10	1 "	"	"
133	26	"	...	Yes.	19 yrs.	Severe 8 yrs.	Yes.	Yes.	Both	"	1 "	3 "	"	"	Slight.	Slight.	"	"	" 13 "	12 "	3/10	3 "	"	"
134	16	"	...	...	4 "	No.	No.	No.	R.	"	6 "	2 "	3/10	"	No.	No.	"	"	" 5 "	2 "	3/10	20 "	"	"
135	31	F.	...	Yes.	21 "	Severe 12 yrs.	Yes.	Severe 9 yrs.	Both	"	4 "	4 "	"	"	Slight.	Slight.	Slight.	Slight.	" 11 "	3 "	3/10	7 "	"	"
136	21	M.	...	"	8 "	Severe 8 yrs.	"	Yes.	R.	"	3 "	2 "	1/10	"	No.	No.	No.	No.	" 7 "	1 "	3/10	7 "	"	"
137	8	"	Yes.	...	2 "	No.	"	No.	L.	"	1 "	1 "	No.	"	"	"	"	"	" 3 "	2 "	No.	9 "	"	"
138	11	F.	"	...	4 "	"	"	"	"	"	8 "	1 "	"	"	"	"	"	"	" 18 "	4 "	"	4 "	"	"
139	9	"	"	...	6 "	"	"	"	"	"	2 "	1 "	"	"	"	"	"	"	" 6 "	3 "	"	5 "	Measles.	"
140	6	M.	"	...	1 "	"	"	"	"	"	3 "	3 "	3/10	"	"	"	"	"	" 6 "	3 "	"	7 "	"	"
141	8	F.	"	...	3 "	"	"	"	R.	"	8 "	1 "	3/10	"	"	"	"	"	" 6 "	3 "	"	6 "	"	"
142	12	M.	"	...	8 mos.	"	"	"	"	"	2 "	No.	No.	"	"	"	"	"	" 9 "	2 "	3/10	3 "	Diphtheria.	"
143	9	"	"	...	3 yrs.	"	"	"	"	"	1 "	"	"	"	"	"	"	"	" 2 "	1 "	3/10	2 "	"	"
144	7	"	"	...	2 "	"	"	"	L.	"	1 "	"	3/10	"	"	"	"	"	" 4 "	3 "	"	1 "	"	"
145	7	"	"	...	1 "	"	"	"	Both	"	1 "	"	No.	"	"	"	"	"	" 12 "	8 "	1/10	1 "	"	"
146	8	F.	"	...	4 "	"	"	"	"	"	3 "	"	"	"	"	"	"	"	" 4 "	5 "	3/10	1 "	"	"
147	6	"	"	...	3 "	"	"	"	"	"	2 "	"	"	"	"	"	"	"	" 3 "	3 "	4/10	1 "	Mumps.	"
148	4	M.	"	...	2 "	"	"	"	"	"	2 "	"	"	"	"	"	"	"	" 2 "	2 "	3/10	1 "	"	"
149	3	F.	"	...	1 "	"	"	"	"	"	2 "	"	"	"	"	"	"	"	" 6 "	6 "	No.	4 "	"	"
150	3	"	"	...	2 "	"	"	"	"	"	1 "	1 in.	3/10	"	"	"	"	"	" 10 "	3 "	3/10	4 "	"	"
151	5	"	"	...	3 "	"	"	"	"	"	1 "	2 "	3/10	"	"	"	"	"	" 2 "	8 "	3/10	9 "	"	"
152	8	"	"	...	4 "	"	"	"	"	"	No.	2 "	No.	"	"	"	"	"	" 3 "	7 "	3/10	1 yr.	"	"
153	7	"	"	...	5 "	"	"	"	"	"	"	3 "	"	"	"	"	"	"	" 3 "	9 "	"	11 mos.	"	"
154	6	"	"	...	2 "	"	"	"	"	"	"	2 "	"	"	"	"	"	"	" 4 "	3 "	3/10	9 "	"	"

O. C. = Ordinary conversation. L. C. = Loud conversation.

the malleus, which was only about half its natural size, and through necrosis resembled in appearance and structure a piece of dried dead wood, that one could with but little force crush between the fingers. The meatus was packed with iodoform cotton and the patient kept quietly in bed for three days. On removing the cotton she said she could hear our conversation and the noises in the street. The tympanum was dry; pain almost relieved; tinnitus much less, and patient feeling happy.

October 12, 1889.—There has not been a drop of pus; tympanum entirely dry; pain gone, and only a little pulsating tinnitus. Hears the fork at nine inches and watch at $\frac{8}{60}$, ordinary conversation at fourteen feet.

November, 1889.—All the above good results continue. The patient feels so well satisfied with the results of the operation on left ear that she now makes a request to have the other ear operated on, as the pain still continues in it. This, however, we refused to do at present.

February 6, 1890.—Again the patient returned to have the right ear operated on. She was advised to wait a few months longer, so as to ascertain definitely whether the results of the operation on the left ear are positively permanent.

May 9, 1891, or about eighteen months from the date of first operation, the right ear was operated on and a similar condition of the drum and ossicles found. The results of operation were quite as satisfactory.

January, 1892.—Patient has been entirely relieved of pain since second operation; hears perfectly well; tinnitus entirely gone; general health excellent, and likes America so well that she has concluded to make it her future home.

May 9, 1893.—Has been entirely relieved of pain from date of second operation; tinnitus has not returned; hearing is entirely normal, and all of these favorable results from the operations have been permanent for over two years.

CASE VI.—B. S., aged eighty-one. In April, 1888, this patient consulted me for deafness, tinnitus, and vertigo. He gave the following history: Forty years ago, while exposed to the sun's rays, was suddenly attacked with slight pain in each ear. He became dizzy, fell to the ground, striking his head with much force, and was carried home in a semi-conscious state. For three years prior to this attack had occasionally complained of a "fulness and queer feeling in the head." For seventeen weeks he suffered so much from vertigo as to prevent him from leaving his bed. From the time of this accident, which was in 1848, to the year 1889, covering a period of forty-one years, he has suffered more or less from vertigo, increasing tinnitus, and deafness. For the past ten years the vertigo would appear without warning, and with such severity as to necessitate his having an attendant with him constantly. During this period of ten years the tinnitus has correspondingly increased, and the hearing-power in like manner become progressively defective. He was entirely deaf to aerial conduction of both watch and fork; loud conversation could be heard at one foot. In his efforts for relief he consulted many physicians, making three trips to Europe for this purpose. In September, 1889, we suggested the removal of the drum and ossicles. This proposition was accepted with great reluctance on account of his age, and more especially because he had been advised not to submit to any surgical operation. We operated on the left ear September 12, 1889, and found the drum in this case thickened and adherent to the tympanum; likewise the ossicles had undergone the above peculiar changes due to necrosis. Six days after operation his hearing and tinnitus had somewhat improved; no pain nor disturbance of any kind followed the operation.

September 27, or fifteen days after operation, he states that nearly all pain and tinnitus has been relieved; has had but little vertigo.

October 18.—Pain entirely relieved; tinnitus much improved; slight vertigo remaining.

November 1, 1889.—Tinnitus and pain entirely relieved; hears ordinary conversation at seven feet; has had but two attacks of vertigo in three weeks.

April 6, 1890.—Operated on right ear with similar good result.

July 6, 1890.—Has just returned from Atlantic City, and reports himself as entirely free from pain, vertigo, and tinnitus; hears ordinary conversation at sixteen feet, watch at one inch, and fork at four inches.

September 12, 1892, or about three years since first operation and two and a half years since the second; has continued in good health, except a slight attack of dizziness, which, however, lasted but a few days.

April 14, 1893.—Has just returned from a trip to the Pacific coast, where he spent the winter and enjoyed good health, being entirely free from tinnitus and vertigo. He hears very much better than men usually do at his time of life.

In the foregoing list of one hundred and

fifty-four operations it will be found that from Cases 15 to 84, inclusive, we record sixty-nine patients presenting the non-suppurative variety of middle-ear disease. Many of these patients suffered from distressing tinnitus, severe pain, staggering, vertigo, and marked impairment of hearing, while others complained of one or more of these same symptoms in a much less degree. Their ages range from twenty-one to eighty-one years. The time in which the patients suffered from one or more of these symptoms varies from two to forty years, while the time elapsing since the date of operation is from three months to four years. The improvement in tinnitus and vertigo has been in many cases most striking and satisfactory, notwithstanding the little hope that could be offered for their relief, in some of the cases, before operation. The probable improvement of hearing in this class of cases is, of course, not marked by so many favorable possibilities as in the suppurative variety, and yet a perusal of the carefully-recorded results will, we think, be convincing that the operation in selected cases is now justifiably demanded. From the results obtained in the class of cases that would properly come under the title of this paper, we beg to offer the following conclusions.

First, however, I should like to remark that this is an age when the public wish to exact from the profession a promise as to the definite outcome of any prospective operation. It is of course proper and desirable that the *probable* result of an operation under consideration should be fully and carefully explained to the patient and his friends. It is well, however, that this should be done in the presence of your assistants or other auditors. A disregard of this simple precaution has caused some honorable physicians, who had worked hard for the best interests of their patients, to be summoned into court by designing and evil-minded persons, who enter suit for damages because a supposed promise had not been fully realized. We would, therefore, begin our conclusions with,—

1. Never promise positive results from an operation on the ear for the relief of tinnitus, pain, suppuration, and vertigo. This promise will often be exacted, but the present status of such surgical procedures is not sufficiently defined to *warrant* us in promising the results which we may hope to attain.

2. Probably no operation in the entire range of surgery (*if carefully performed*) is attended with so little disturbance, either local or constitutional, as excision of the membrana tympani, malleus, and incus, when not complicated with necrosis of the tympanum; in fact, there are very few diseased conditions of the human economy that are so prone to be productive of good results as is excision of the membrana tympani and ossicles in certain ear-diseases.

3. Tinnitus, vertigo, impairment of hearing, and pain are almost certain to be relieved by the removal of the drum and ossicles, if not dependent upon some structural changes in the internal ear.

4. The longer the middle-ear disease has existed (as characterized by tinnitus, progressive loss of hearing, pain usually not well defined, and possibly vertigo) the greater is the danger of some serious structural lesion of the internal ear, and therefore the less hope of materially improving the hearing-power; and yet, even in extreme cases, the tinnitus, vertigo, and pain are more or less benefited, sometimes markedly so.

5. If, after due and proper efforts to relieve progressive aural diseases, you do not produce a speedy and marked improvement, no time should be lost in performing the radical operation; for by delay an internal ear complication may have become established, and this always makes probable benefit more doubtful.

6. It is not well to express too much hope that the operation will materially improve *hearing* in long-standing, non-suppurative cases; and yet, when the chances are so much in favor of its producing entire freedom from tinnitus and vertigo, and especially since there are such great probabilities of a rapidly-progressing disease becoming arrested from the date of operation, it would indeed seem unfortunate if such patients were not offered the benefit of this doubt, if such it can be termed.

7. In all cases where the membrana tympani is thickened, markedly retracted, and made firmly adherent by old inflammatory products to the tympanic walls, and where in this same connection you find the ossicles completely anchylosed, the function of these parts under such circumstances is of course entirely suspended; therefore, in consequence of this condition, this part of the conducting apparatus can be regarded only as a foreign body, and, as such, the only rational hope for relief is through removal, which will in the majority of cases relieve tinnitus and vertigo, while at the same time improvement in hearing can reasonably be expected on account of the opening thus formed admitting the sound-wave which impinges directly on the stapes and fenestra rotunda.

8. As a preventive of necrosis of the temporal bone, mastoid abscess, aural polypi, and

serious brain-complications (when the result of chronic aural discharge), the suppurating ear should not be allowed to continue and thus become chronic. If, therefore, under the usual methods of treatment the discharge does not permanently yield, it is certainly good, and I might say imperative, surgery to promptly extract all fragments of the membrana tympani and necrotic ossicles, for in so doing you have taken the only rational step to produce a cure of this always dangerous discharge by first removing all foreign matter and thereby establishing a free drainage, and, furthermore, giving an opportunity of properly treating a diseased cavity that otherwise would be inaccessible; and inasmuch as the writer has not met with any failures in this class of cases (when unaccompanied by extensive necrosis of the tympanic cavity), he is forced to express the belief that *timely surgical interference* cannot be too strongly urged, for by so doing you eradicate the primary disease, and thus prevent these always serious and ofttimes fatal complications.

SCABIES: ITS SYMPTOMS, DIAGNOSIS, AND TREATMENT.

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SINCE the influx of certain elements of civilization to American soil we certainly have had a decidedly large increase in the number of cases of scabies, and as there will be no abatement until the huddling together of these people is done away with, or until they be placed under better hygienic conditions, it is likely they will still further increase; and as we all should be on guard, that we may be able to cure all cases as soon as possible, I will give you this morning the symptoms, diagnosis, and treatment of this affection.

Scabies affects certain portions of the body, and attacks the body in such a way that all those affected with it suffer innumerable tortures from the diverse points of itching, and, as the disease is contagious, it is well that we know something of the appearance of the disease upon the skin, the localities affected, and the cause of it.

The disease being one of parasitic origin, is caused by a small animal,—the *Sarcoptus* or *Acarus hominis*,—the female parasite being larger by double than the male. It is a whitish, opaque body, measuring from one-seventh to one-fifth of a line in length and one-eighth to one-sixth of a line in breadth, and as the female is the cause of the lesions of the skin, the male dying shortly after impregnating her, it is to her destruction that we must look.

Shortly after impregnation the female enters the skin by burrowing beneath the surface, in like manner to a mole entering the ground, and, as she progresses, enlarges the burrow and at the same time deposits eggs, and after laying a certain number—about six or eight—she dies. The young parasite, after being hatched, reaches the surface of the skin by means of the free extremity,—that through which the mother entered,—and as she reaches the surface meets the male, becomes impregnated, and then immediately burrows and goes through the same course as her mother before her; and as these conditions are likely to go on indefinitely without they are soon checked, you can see what they will be in a short time.

The appearance of the burrow upon the skin is that of a darkish streak, which is made by the fæces of the parasite; it may be either straight, curved, or tortuous in character, and ranges from one-eighth to an inch or more in length. One end, being free, is sometimes marked by a small vesicle or pustule; the other is blind, and here the mother parasite lies as a foreign body. In fact, the patient will not come to you until the condition has reached the maximum,—about one month after contagion,—complaining of the itching and a skin eruption, and as the burrow is now very well marked, you may find it upon those portions of the body where it is the warmest.

On inspecting the patient, examine all portions of the body, as you have often seen me do. Do not be satisfied with a peep. Have the patient strip positively as far as the waist. Look first at the hands; examine the sulci between the fingers, the wrists, but do not conclude that the case is not scabies if you do not find anything upon them, because in Americans, who are, as a general rule, cleanly, we often find that the hands are unaffected. Next inspect the bend of the elbow, the axillæ, and parts around the front of the shoulders, the lower part of the abdomen, the lumbar region, and the nipples and breasts of the female, the buttocks and inner parts of the thighs and genitals of the male. If the patient be an infant in arms, look at the face, as this is the portion that comes in contact with the breasts of an affected mother. The feet of infants must also be examined.

If you have persisted in this examination, you will find evidences of the disease. From within the burrow you can remove the parasite

upon the head of a gold needle; but, unfortunately, this cannot always be done, and at such times a knowledge of the situation of the disease will, as a rule, suffice. In this condition you will also find the evidences of decided itching in the accompanying dermatitis.

After examining the patient and being fairly satisfied that the diagnosis is correct, the next thing would be the treatment. But suppose for an instant that you are doubtful what are the diseases that may resemble it, and *vice versa*.

Eczema is not likely to be so diffuse; not found in the usual scattered sites of scabies; will not be the diverse points of itching; lesions are not likely to be multiform, but there will be a moisture, with some infiltration. The itching in eczema is marked at all times, while that of scabies is more so after disrobing for the night.

Pediculosus Vestimenti.—Parasite, as a rule, easily found in the seams of the clothing; the upper part of the chest and back are affected, while these are unusual sites for a scabies; hands are never affected; no burrows; the outer sides of the thighs rather than the inner.

Urticaria. — Lesions disseminated, while scabies may be found in the usual sites; but if urticaria be present in the case, as I have seen in a number of instances, you must certainly find the burrow, and then your diagnosis is undoubted.

Being perfectly satisfied that the diagnosis is correct, we want to know something of the treatment. Naturally the first thing is to procure extreme cleanliness. This is best done by using some common soap, placing the patient in a bath-tub, and directing him to lather himself well, rubbing all parts, and then rinsing all over the body. If by this process you irritate the skin a little, it will the sooner be cured.

Immediately after the bath you must rub into the affected parts the chosen parasiticide, placing on the patient a clean suit of underclothes, rubbing the ointment on every evening, and allowing this underwear to remain on the patient for at least three or four days. By this means you have the ointment in constant contact with the affected parts, and thus, I believe, more rapidly cure the disease.

In the treatment of this affection sulphur seems to have held, and to still hold, the first place, in whatever form it may be prescribed. The other remedies that may also be applied are naphthol, styrax, and balsam of Peru.

I will speak of each of these remedies as I show you the cases.

The first cases are a mother and her child. Examining first the child, which is about four months of age, you notice the eruption is scattered over the hands and wrists in large pustules. You will also note the same condition on the feet and ankles; and as the child is nursing, you see that the face is well covered with the pustules also, and here on the left side of the neck I show you a burrow; the buttocks, thighs, abdomen, and back share the same condition.

The mother, you note, has no lesions upon the hands. This I have seen in a number of instances when the patient has been an American. So, as I have often told you, do not say that scabies is not present because the hands are free.

For the mother I prescribe the following:

℞ Sulphuris sublimatum, ʒi;
Adeps, ℥i. M.

And for the child:

℞ Sulphuris sublimatum, gr. xv;
Adeps, ℥i. M.

Directions will be given that each patient take a bath this evening before retiring, and will cleanse all portions well, then will be applied the ointment to every point of disease, after which they will put on a clean suit of underwear, and every evening for three or four days they will continue the use of the ointment, at the end of which time they will take another bath, and go through the same performance. At this time it will be well to examine them, and, as a rule, they will be well of the scabies.

The next case is that of a young man (Pole by birth), and his condition has existed for some time. This you find in this class of people always as well marked as here. Having the patient strip, you find that the eruption is on the usual sites, and here I show you several upon the penis. Here upon the under surface I show you a burrow; it is about a quarter of an inch in length. The young man states that the condition has existed for four months, and that he has not had any treatment. Therefore, from his being rather timid about taking a bath, and not receiving any advice of a physician, you can readily understand why the affection has gone on to this proportion.

In prescribing for a case as bad as this, you may use remedies that are somewhat stronger than in the preceding cases, remembering that we have a decided eczema here, and, if possible, do not make this any worse; but as we

have also a tough skin, we will not be likely to make the eczema more prominent.

℞ Sulphuris sublimatum,
Olei cadini, of each, ʒii;
Cretæ præparata, ʒiiss;
Saponis viridis,
Adipis, of each, ℥i. M.

This is the Hebra modification of Wilkinson's ointment, and in such cases as these there is nothing better; but in the majority you will be obliged to dilute it one-half. This is applied after the preliminary bath, and used as in the preceding cases.

If this ointment appears to disagree with the patient it may be changed to the following:

℞ Sulphuris sublimatum, ʒi;
Balsam Peruviana, ʒss;
Adipis, ℥i. M.

And the same instructions given as for the former ointment.

Sometimes I have prescribed the following, which I prefer in most cases:

℞ Sulphuris sublimatum,
Naphtholis beta, of each, ʒi;
Adipis, ℥i. M.

With this preparation I have seen better results than with the others, and have in only one instance observed the bad effects spoken of from the use of the naphthol. This is applied with the same preliminary measures as with the other preparations.

This young man presents himself for the first time, and we will study his case together. He states that the eruption has existed for one month; that at the time of contracting it he was a travelling salesman; that one night he was obliged to sleep with a fellow-traveller, and a few days after noticed an itching on his arms and legs. He examined himself, and finding nothing, he used some carbolic acid, as this seemed to give him relief; but after two weeks he noticed that small vesicles or pustules presented themselves, and being frightened, he comes to us. Looking in the usual sites of a scabies, we find that the eruption is mostly on the arms and legs, over the hands and wrists, and on each axilla, over the genitals and buttocks. I here mark a burrow, and to demonstrate that the diagnosis of scabies is the correct one, I take a gold needle and pass it along the burrow, and now upon the point you can see a small whitish opaque body, which I will place under a microscope and pass among you, cautioning you all to look at it well, because some day you may be obliged to make your diagnosis this way, and now is your time to study it.

I will prescribe for this case as follows:

℞ Styrax pulvis, ʒi;
Adipis, ℥i. M.

And as he will be instructed to use the ointment as in the other cases, we will hope for a speedy cure.

If at any time you should wish to prescribe the remedies in some other way, one of the following will be beneficial.

The plan adopted by Sherwell, of New York, is to rub the whole body with dry *sulphuris loti*, after the application of a bath. This has at times given good results in my hands.

The sulphur vapor is recommended by some, and is easily made by having a heated surface, either iron or brick, the patient being wrapped in a sheet, and the dry sulphuris loti placed thereon (about two ounces of the drug). This may be repeated every day, and the patient can go about his business soon after the bath without fear of catching cold.

Of all the methods spoken of, I myself prefer that of sulphur and naphthol, as I have got far better results with it than with any of the others, and can safely recommend it as a speedy cure; more speedy than those above spoken of.

ON THE CONDUCT OF REST TREATMENT.

By J. Madison Taylor, A.M., M.D.,
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I AM frequently asked to give a distinct outline of the mode of procedures used in the treatment by rest, seclusion, and forced feeding, which has been proven to be of such large value in many otherwise unmanageable cases. Dr. Weir Mitchell, to whom is due the credit of devising and using this measure with unapproachable skill, has said all that need be said much better than I can possibly do. However, it may be of service to comply and give a simple, straightforward account of the various measures which go to make up this method of treatment, that it may be more clearly understood by those of my class who desire initiation into its supposed mysteries. Mysteries there are none. Like all other surprisingly successful measures, some element of difficulty is supposed to obtain, but such difficulties as do exist are lack of skill in using simple tools. It is true there are those who can use

this treatment best, and they are few. Others attempt it with much hopefulness and miserably fail. Why this should be I shall attempt to point out. The elements of failure are usually lack of exactitude in routine measures, insufficient accuracy in the amounts and degrees, times and seasons, and, above all, absence of tact in handling the individual patient. Indeed, this last is perhaps the most obvious defect of the unsuccessful in dealing with involved cases resulting from prolonged depreciation of health, and which is only eradicated by judiciously-selected and tactfully-adjusted measures. My own claim for the right to express an opinion upon this subject is due to the fact that I have had the best of teaching from Dr. Mitchell himself, as his assistant for many years, and also a fair measure of success with my own cases similarly treated.

A number of medical men here and abroad have attempted to follow out the very clear directions of Dr. Mitchell, and have signally failed; a few have succeeded extremely well. Dr. Playfair, of London, avowedly following the directions given by Dr. Mitchell, has recorded a large measure of success. In this country many use this treatment, but with very varying success. It cannot be claimed that a series of procedures will always bring about desired results, and this may only be expected when the plainly-enunciated conditions requisite to success have been observed. Dr. Mitchell distinctly states that he only uses this when all reasonable measures have been tried in vain. There are, with the many advantages, decided disadvantages here to be encountered. There are cases suitable and cases altogether unsuitable. Unless the environment be well adjusted, failure will be the rule. If one or the other essential condition is to be absent, it is difficult for one of limited experience to know which may be omitted without disastrous results. It is well known to you that in every instance of long-continued ill health there comes upon the individual, superadded to the physical disability, inevitable psychical entanglements. It is impossible for one whose body has long been ailing to retain clear judgement as to needs. Most often hysteria becomes fastened like an incubus upon such, and even in those rare instances where this difficulty is escaped, there is a long array of bad mental habits which complicate the original difficulty, not only involving the patient himself, but also all those upon whom he depends for advice and counsel. Nor does the physician in attendance always escape this growing cloud of misapprehension. One needs to have a wisdom vouchsafed rarely to withstand the mental astigmatism which comes of watching for long months the same slowly-progressing patient. The medical man cannot be always clearly judicial in his estimate of statements of subjective phenomena. He may, indeed, take the liberty of doubting the accuracy of much that is told him, but the mere adding doubt to demurrer here and there will do little to make clear the real phenomena which the patient, oftentimes unwittingly, misdescribes. As to the parent, husband, or wife, and especially where only the children of an elderly person have him in their control, it is impossible to discount the elements of confusion which are bound to arise. The customary authority which a parent exerts, met by the habits of obedience of children or dependents, make the questioning of this authority a scarce endurable offence. In the matter of husband or wife, the vigorous one counts himself in a sense brutal if he does not accept literally much that is said to him by the sufferer; and so, one way or another, a net-work of misapprehension gradually arises, making it impossible for any one to untie the Gordian knot; hence the only real hope of success is by the process of swift severing by changing the environment utterly.

The cases, then, to which it is customary to apply these systematic measures of absolute isolation, rest, and forced feeding are those whose health has suffered so severely or for so long a time that there has come the invalid habit complicating the real disability. Much may be done, of course, by a simple change of scene and air, but there is always the necessity of proper guidance, even under changed environment, and it is a matter of frequent observation that this has been tried for months most unsuccessfully, leading finally to the necessity of more clearly-defined and judiciously-selected measures. There are certain working axioms which obtain with almost no exception. The first is that the home of one so circumstanced is never the place to get the best result. This is so entirely true that it may be safely affirmed that a case of prolonged indisposition, which comes to a practical stand-still, can never be made well at home and surrounded by accustomed objects and circumstances. Another fact is that the nurse or care-taker should never be a relative or friend. The reasons for this are plain enough. The relationship between patient and relative is always upon some basis of emotion. It is impossible to disassociate the personal feelings and traditional conditions which sway the judgment of a familiar. Moreover, the scraps of conversation between

patient and nurse had best be on entirely new lines. Even though these partake too much of hospital twaddle, it is better than to rehash the history of ancient sufferings.

Moreover, as pointed out above, the physician himself, who has been for many months, it may be, in attendance upon a case which makes little progress one way or the other, becomes by that very act less clear and positive in his judgments and decisions.

The Special Therapeutic Measures pursued in the Treatment by Rest.—We have first the element of rest itself, which should be absolutely in bed, and on the value of which it is needless to enlarge. The rest must not only be complete, in the sense that the patient is put in bed, but he must be encouraged to become entirely restful. Unconscious tension may defeat the ends to be accomplished for a very long time. Indeed, some people, even after an extended period of lying prone, yet practically hold themselves on to the bed. They fail to recognize the existence of four stout legs, capable of sustaining many times the body-weight. It may be necessary to dilate extensively on the need for relaxation after the manner of the Delsarte teachings, which, by the way, were formulated and in use long before Delsarte ever began his interesting crusade against over-tension. It will usually take several days or a week to secure absolute rest,—a letting down of all the motor forces. But of this question I shall speak more at length anon.

Routine measures themselves have a beneficial effect, not only in that they may be so adjusted as to have inherent value, but their very monotony helps to soothe and tranquillize. The isolation should be in most instances complete, certainly at first. Freedom is thus secured from small excitations, such as new and oft-repeated impressions upon eye, ear, and brain, and the patient is relieved from constant consequent drains upon his nerve-energies. He is also in the line of relief from a tendency to over-tension.

An excess of food may now be given, and it is surprising how much can be taken, retained, and assimilated. At first it is customary to reduce the food to a scant variety and let it consist largely of milk, for several reasons. The exclusive use of milk in itself exerts a most tranquillizing effect, especially in those who are excitable and of irritable temperament, and in whom there is a large undercurrent of unrest. Often it is necessary to begin rest by the use of an exclusive milk diet for a time, gradually adding solid food by little and little as conditions progress. As a rule, however, it is needful to make small change in the diet other than to reduce the habits of the individual to the simplest routine, such as an early breakfast, a mid-day dinner, and a light supper. These are supplemented by a cup of some hot drink on waking, a glass of milk or bowl of soup between breakfast and dinner, sometimes between dinner and supper, and usually some fluid food at the bed hour.

Now, "to rob the rest of its evils," come the auxiliary measures, chiefly by the mechanical agents, massage and electricity. Massage may be well done or ill done, and is always more or less useful, unless distinctly contraindicated. This provides the person lying in bed passive exercise, along with other valuable effects of which I will speak again. Indeed, a good hour's active massage is equivalent to about a five-mile walk at an easy pace, quickening circulation and metabolism, and yet, withal, putting no strain whatever upon weakened organs,—the heart and nerve-centres.

The form of electricity usually adopted is tonic faradism administered for three-quarters of an hour. Massage is put always in one-half of the day and the electricity in the other half, and each of these sufficiently far away from a meal. Generally there is some form of tonic used, either a nutrient alone, as malt extracts at meal-times, or a simple ferruginous tonic, or both. Bear in mind, the chief tonics are, in addition to the rest and other special measures employed, the mechanical spurs of the nutritive processes, massage and electricity.

Difficulties to be met.—It is often a troublesome matter to persuade a person to contemplate so long a treatment, especially when able to be up and about. In overcoming this objection it may be necessary to urge the very probable value of at least an experiment, making it clear that the rest of a week or two will be found so far from disagreeable that more may be readily endured. Then, if persuaded of its value, it may be decided to go on to the conclusion. It may be well, moreover, to clearly state that the really disagreeable period ends with the first week. When one can endure this, it is rarely difficult to continue for a longer period. Indeed, as a matter of fact, even the most restless folk, after a week or ten days in bed, will sustain a curious reversal of their original views as to its endurability and be usually willing to lie indefinitely, so great is the charm of rest when once experienced by one who sorely needs it. I have seen a tired school-teacher, who fought the idea of giving up from October until May, and who then could only afford barely four weeks of

rest, sleep twenty or more hours out of the twenty-four, merely waking for food, and falling asleep during the manipulations of bathing, massage, and the like, and who admitted that the delicious, luxurious comfort of the rest was greater than any delight she had hitherto contemplated. Indeed, the other chief difficulty is in inducing the patient to get up and stir about again when the period of rest has properly ended. This is a more troublesome matter than would ordinarily appear, and requires much art on the part of the physician to determine how soon the patient shall rise, how long a period remain up each day, and how rapidly activities shall be increased. It is customary to occupy not less than a month or six weeks in the first period of absolute rest. Less than this is of questionable avail; more than this may frequently be needful. After the absolute rest it is well to take a month or six weeks longer in getting one gradually back to more active habits. At first, sitting up for five or six minutes often gives great fatigue. More often ten minutes can be profitably occupied sitting up in an easy-chair, and this to be increased a minute or two a day for perhaps a week; then up twice a day is permissible, and longer increments of time thus occupied, five minutes being added to each until an hour is thus disposed of in the morning and another in the afternoon. In three or four weeks thus employed, the season permitting, small excursions out of doors are useful,—a brief drive of half or three-quarters of an hour; and thus little by little the outings are increased until at least once a day an extensive excursion of an hour to two hours and a half becomes a pleasure as well as a gain.

Meanwhile, during this uphill progress, much care must be exercised not to overtire the heart and muscles, long unaccustomed to work. The first fortnight of sitting up is the most difficult. The remedial Swedish movements here occupy the place of some other remedies, and by little and little the individual muscles are brought into a higher degree of efficiency, and along with these, the muscular pump of the heart and the motor apparatus generally.

Nor do the difficulties cease when once a person is able to go and come with ease and pleasure. If the absolute treatment by rest occupies three months, the three months following have need of close, tactful supervision. The amount of work to be done must be carefully estimated and provision made for needful conservation of energies at all times. If the subject be a woman, this is best occupied by sea-air or change of scene of some sort, living quietly and systematically as before; if a man, we have usually to face the necessity for a return to work. If possible, this should be diverted; if not, careful regulations must be written for him, and he put on parole to follow as conscientiously as possible. Well is it to bear in mind that where extensive exhaustion has arisen, not only are the nutritive capacities, but also the nerve-centres, greatly enfeebled. Hence the gradations towards recovery stand thus: The disentanglement of the psychical and physical sort comes first into line. Gradually the patient learns to see as through a glass his own shortcomings,—the folly of a life which has brought about the catastrophe. Quite rapidly better digestion, assimilation, and functional sequences follow, and this results in much satisfaction and pleasure to the individual. The joy of living, in short, comes back again. This progress may occupy only a few weeks. Then comes the period of structural upbuilding, when the muscular tone improves, the round of circulation becomes systematically more wholesome, and the bodily shape is restored much as when the individual was at the best, and all this in perhaps two or three months. Here an energetic person will be prepared to think that thorough restoration has been reached, living in this secluded fashion, even though he be going out and enjoying himself abroad; so largely is the joy of living restored that he begins to regard himself as once more a part of the world's machinery. And in the case of those who have to sustain large responsibilities, a very considerable peril lurks just here. If he allows himself to be over-persuaded, by his own desires or the solicitation of friends, to attempt work, he will quickly find his capacity for endurance pitiably small. Just as in the training of an athlete, systematic measures first bring about a good condition, so far as the symmetrical workings of the various organs are concerned, but a long time is needed to gain that ever-to-be-desired quality, staying power. So here months are needed instead of weeks to produce the best results. In proportion to the degree of exhaustion which existed when this treatment was begun, a period of not less than from six months to two years is required to bring the individual back to his full working power. The watchful eye of a thoroughly-trained physician is necessary, moreover, to judge. I have under my observation even now an admirable illustrative instance of all this. A highly-intelligent lawyer of New York came to me eight months or more ago, knowing so much of this whole matter that he allowed his own judgment to be put against mine. Twice

since I saw him has he attempted to go back to work before I judged him fit, and only a few days ago word came to me that he again must leave and take that rest, of probably not less than a year, which was pronounced needful for him after all the measures have been instituted to bring about nutritive repair.

When organic disorders underlie the exhausted states, a greater insistence must be placed upon this delay. Disorders of the kidney, however, may get unexpectedly well during this *régime*. Incipient diseases of vital organs known to menace are ofttimes checked. Especially true is this of mental deteriorations and cord-troubles. Locomotor ataxia has been notably improved, and acutely-painful states, as sciatica, entirely cured thereby.

Outline of Daily Routine.—The best results are had from modelling the day much after that of an ordinary working person. Measures should begin early in the morning. The patient usually needs to be aroused by about seven o'clock, or even earlier in summer weather. With the first peep of dawn the nurse should bring a cup of some hot drink to the bedside and administer it. A small cup of cocoa is in some ways the best, or it may be hot milk or weak coffee or tea. The cocoa is useful for those who need to be especially fattened; the tea perhaps better for those who are already burdened with soft flesh. The hot drink acts both as a food, enabling the patient to bear the fatigues of the subsequent bathing and partial dressing, and also the heat acts as an admirable stimulant. Indeed, a cup of hot water in the morning is a far more competent eye-opener than any combination of alcohol. This I have proven beyond peradventure time and again in the case of men accustomed to take much tipple, and who yet became more enamoured of a cup of hot water, with possibly a slice of lemon in it, than any combination emanating from a bar. After the cup of hot fluid, the nurse administers a bath. This is best as cool as possible; to those who can endure it, it should be cold. It also is the better for containing some stimulating property, as salt; a tablespoonful of salt in a basinful of water, to be conveniently ready, is then employed by the nurse, the patient lying between blankets to prevent all chill. The nurse takes one limb at a time, bathes it gently, and afterwards rubs the skin to a good pink glow. As each part is disposed of it is carefully protected by the blanket and the next approached. This occupies probably half an hour. Then a little rearrangement of the clothing is had and the subject made comfortable for the day. About eight o'clock comes an ample breakfast, which will be found in no way interfered with by the small cup of hot drink earlier. After the breakfast a period of rest is had, while the nurse attends to duties elsewhere, and the patient is not allowed to be disturbed in any way. The next meal is a little after mid-day, about one o'clock, which takes the shape of a liberal dinner. At six again comes the last meal, a fairly-substantial supper. After each meal a period of an hour should elapse in which the patient is not to be in any way disturbed. Between breakfast and dinner, about half-past ten, fluid food is again given,—milk, broth, or soup. In some cases this is repeated between dinner and supper, and at nine o'clock, or before the final tucking in for the night takes place, it is customary to give again a glass of milk, preferably warmed. The massage should come either in the morning, just before the milk, or in the afternoon, midway between the meals; the electricity in the half of the day not occupied by the massage, either forenoon or afternoon. On going to bed at night there is frequently given a dry rub to the skin with a coarse towel, or if salt is not used in the water in the morning bath, with what is called a salt towel. This consists of a plain crash cloth dipped in a strong salt solution and hung up to dry, and makes a very stimulating application to a flabby skin. Massage is best used in the morning, and is usually followed by the glass of milk already described, the patient again lying entirely quiet for an hour. Electricity is best given in the afternoon, and need not be followed by anything except a little pleasant conversation, perhaps. Indeed, the hour for the physician's visit is best during the latter half of the day, when, the occupations being somewhat less systematic and the diurnal ebb and flow of vital forces being at their lowest, the patient becomes most lonesome, the thoughts dwelling upon home and other emotional matters, so that the visit of the physician is welcomed in turning aside these discomforting thoughts. The electricity, indeed, is best administered by a physician, and, properly done, need not occupy above half an hour, making a very agreeable break for the patient. To be sure, this may be used by a young physician trained for the purpose, or, in some instances, by the nurse, but it is of distinct value oftentimes to have a variety in personalities, even in these routine measures.

The daily evacuations should be sedulously regulated. It is well to follow the habits of the individual as to the time of the bowel movement, but if this can be put in the after-

noon, it is sometimes better. However, a full daily evacuation of the bowels should take place at some regular time, and the will of the individual trained to bring this inevitably to pass. Not the least of value in this whole matter is establishment of a thorough systematic habit of body and mind. At first there should be entire dependence of the patient upon the attendants; later, as active measures are instituted, the patient is to be taught and urged to direct his own volition in accomplishing the various measures which he must soon or late depend upon himself to continue. The urine must be looked to, the quality and quantity of this carefully noted, and fixed times are very useful also for this.

The temperature should be taken regularly twice daily to observe the fluctuations and tendencies. It will often be found about 100° F. for two or three days, then drop to subnormal for a few more, and finally become and remain normal.

Diet.—An ordinary, liberal, wholesome diet list is, as a rule, not especially limited in any direction. If there be manifest digestive difficulties, these are met by such measures as may be plainly indicated. Where marked loss of digestive tone exists, it may be necessary to begin with peptonized milk every two hours, rapidly adding to this both in amount and also by various semi-solid and solid articles. If the patient be profoundly anæmic, as often happens, and this may be definitely determined by a counting of the blood-corpuscles, forced feeding, by which is meant urging food upon the stomach, is early instituted. Where the patient is exceedingly feeble, the nurse is directed to feed him with her own hand, taking up the food bit by bit and handing it to the patient on a fork; also inducing him to drink the necessary amount of fluid food to the last drop. Many times a person is indisposed to eat from sheer fatigue in handling a fork. This may seem doubtful, but is nevertheless frequently demonstrated. A person who has for months or years eaten even as the birds eat, or are supposed to eat, little or nothing, can thus be induced in a very short time to take such an enormous quantity of food that no one is more surprised thereat than himself. Not only so, but folk whose digestive capacity has been considered the most diminutive can soon swallow and assimilate astonishing quantities of provender. Milk should always be used as a faithful ally. Of course a large number of people have come to believe that they cannot take this very important article of diet without distress. Like most other self-deceptions, this is usually provable to be a myth. Of the one person out of five who declares he cannot take milk, it is fair to assume that only one in thirty or forty can really not do so. This milk should be given—sound, wholesome cow's milk—in its full strength. Many times it may be necessary to reduce this by skimming or by dilution. Sterilization, as is perfectly well known, enormously impairs the nutritive value of milk. The reaction against this fad has happily set about. Very rarely is it impossible to secure thoroughly good milk, and it should come, as fresh as possible, of course, and prepared rightly at the dairy, straight to the patient twice a day. The dairyman is not so dishonest a fellow, by a long shot, as he has come to be thought. Milk should be chilled to not less than sixty degrees immediately it comes from the cow; thus are the objectionable gases eliminated from it, and other changes wrought, too many to mention, which render it fit for human food. The containers of this milk should always be absolutely clean and alkalinized. It should, moreover, be sedulously guarded from contact with offensive matters, which pollute it, be these of a solid or volatile nature.

A considerable proportion of those for whom rest treatment is needed are fat, anæmic women. In the management of these cases much trouble inevitably arises. For them it has been found best to use a skimmed-milk diet, somewhat after the manner of Karell, of St. Petersburg. This, in brief, consists of specified amounts of milk, say about four ounces every two hours, and nothing else except water allowed. If hunger grows very distressing, this may be rapidly increased half an ounce at a time each day until eight ounces are taken every two hours, then ten or twelve ounces every three hours, and finally, in a short time, small amounts of meats, fowl, oysters, etc., with a little toasted bread, a few stewed prunes, etc., until the diet is gradually increased and sufficiently. Upon this diet the valueless fat very soon begins to melt away, and in a few months' time, along with powerful massage, sometimes given twice or even three times a day, the whole contour of the individual is changed, not only architecturally, but mentally, and the peculiar, peevish whining of such women is most agreeably modified. Thus, in two or three months they can be literally made over upon a very much improved plan. Peptonization is at times employed for milk, where the difficulties of digestion are really considerable, and this, to my mind, is best done by what is known as the cold process. About 3 grains

of pancreatic extract and 5 grains of bicarbonate of sodium, in a powder, are put into a glass and rubbed thoroughly with about a tablespoonful of milk. To this is added the rest of a glass, the whole agitated in what is known as a shaker, or tin cup placed over the top of the glass, and administered immediately. Not only is the milk thus rendered free from latent acidity, but agreeable by the mechanical addition of the air giving it a lively, bubbling quality. Of course any addition of alcohol to this preparation kills the digestive ferment. Ordinarily peptonization is not necessary. In extreme cases the peptonization should be carried on by subsequent warming for twenty minutes or half an hour, but this gives the milk a disagreeable taste which is very offensive to most persons. Soups are used largely, too, as an auxiliary food,—good broths, especially chicken and oyster broth. Clam broth is a charming addition to the dietary when procurable, and if the patient's appetite is amply good, more especially in the second or third week, may be substituted with advantage for the milk between meals or at night. As to the articles which constitute the regular meals little need be said, except that they should be well prepared, of course, and free from objectionable qualities. It is a matter of common experience that a notable dyspeptic will, in a few weeks of this treatment, comfortably take a breakfast consisting of what are supposed to be very indigestible substances, such as buckwheat cakes and sausage, with perfect impunity, or even that monumental rock on which so many split, Boston baked beans. A lady said to me on one occasion, "They gave me beans for breakfast, great fat beans, with brown coats on them,—regular rubber overcoats. I ate them because you said I should take anything brought to me, and to my unspeakable astonishment they did not do a particle of harm."

There are many details as to this matter of diet of which it might be interesting to speak, but in trying to confine myself to the essential matters only, little more need be said. The habit of eating slowly is given an admirable opportunity of establishment,—a precious possession. If the act of feeding be tiresome or the patient show signs of slighting this function, the nurse is instructed to feed urgently, almost forcibly, always with kindly tact and cajolery. Thus twice as much is often disposed of, and without any subsequent discomfort.

Where fattening is desired much butter is used, always the best, spread as liberally as possible on the bread or toast.

Medicines.—One of the chief advantages of this plan of treatment is the absence of drugging and the dependence upon the rational tonics of rest, system, food, passive exercise, and freedom from artificial stimuli and other forcing agents. It is important to keep the bowels active, so that assimilation may be encouraged. The medicines most important are those which aid digestion,—that is, the nutritive tonics, as malt, which does more than aid in the digestion of starches, and seems to exert some curious effect beyond this function. The form of malt may be the fluid extracts, which are usually little more than a bitter, slightly alcoholic stimulant, with small diastatic power. Some of the preparations of this upon the market are utterly valueless; those that seem to be useful very often soon deteriorate as they become popular. For my own part, I rely largely, when needing this particular form of tonic, upon the reliable Guinness's stout, which is a little high in alcoholic strength, but far more agreeable to the taste. The Bass Company makes a very good malt, and there are a great many excellent American malts and a very much larger number of worthless ones. The sugary extracts are much alike, and sometimes do better than the fluid preparations, especially where it is convenient to combine these with cod-liver oil, or the digestive ferments, such as pancreatine. These are best administered with the meal. At times the Guinness's stout is a very valuable aid to appetite, taken just before eating. Cod-liver oil is generally needed, and can be given in many ways, but perhaps the best is a freshly-made emulsion by a reliable chemist. Capsules are very convenient for those who are much distressed by the taste. Iron is the great sheet-anchor. Dr. Mitchell usually prefers the lactate, given in large doses, increasing from a small one until very large amounts are taken. To those with whom iron *mentally* disagrees the pyrophosphate, or some such tasteless preparation, is given in the malt. As the patient begins to be more active the lactate of iron in pill with strychnine is used. For obstinately slow bowels a little bit of aloes may be added to the pill, to slowly stimulate. Sometimes it is important to help sleep in those who have been much disturbed in their rest, and for this the simpler hypnotics, such as sulphonal, the efficient but disagreeable-tasting paraldehyde, or the bromides, are efficacious. When one's tranquillity is secured all such are promptly withdrawn. The mere habit of sleeping very often becomes improved by the other measures employed, and artificial aids are rarely needed long.

Massage.—As I said above, this may be only moderately well done, and yet of great value. Massage is being pretty widely understood and employed now in this country, and is no longer a novelty; but, curiously enough, it is over-understood,—that is, a large number of very intelligent people have got the notion that massage is a name for a comprehensive series of measures, whereas it is simply a mechanical tonic in the form of passive exercise. It would be impossible to give any complete account of this here, but a few remarks may be of use as to the kind of massage which Dr. Mitchell chiefly prefers. The Swedes, who deserve the credit of reducing this to a scientific measure, yet err in using too much pinching. When well done by extremely-skilful manipulators, this is not especially offensive, but rarely agreeable. In the half-taught the pinching becomes a painful or disagreeable process. In America we try to adapt the better points found in all systems and reduce them to a simple working plan, and the form of massage taught at our Orthopædic Hospital is, to my mind, much the best. We have already a large number of graduates working in different parts of the country who are capable themselves of demonstrating the simple and efficacious method there employed. This consists, in brief, of holding the patient in a position most comfortable, and seizing the muscle masses with so large a grasp that considerable areas are pressed upon and kneaded at once. The pressure then exerted may be very considerable, but not painful, the chief point being to make the upper tissues rub the lower ones, and all so judiciously and firmly that not only a considerable cell-activity is elicited, but a secondary feeling of comfort should result. After the part has been sufficiently manipulated, it must be instantly covered to prevent surface-chill, then the next part acted upon and it promptly covered, and so on until the whole body is disposed of, when should follow a period of not less than an hour of repose. When given in the forenoon, fluid food is administered directly afterwards. Rarely is this used after supper, and only in the case of full convalescence. The séance should occupy the better part of a half-day.

For the convalescent, also, the massage is gradually replaced by systematic Swedish remedial movements to more fully strengthen the muscles.

Electricity.—The form of electricity used is tonic faradism with a slow interrupter, causing a full contraction between the poles, held four or five inches apart and applied over the larger muscle masses and, unless contraindicated, over the abdominal viscera, seeking to secure as ample a muscle-contraction as may be between these points without causing pain. In the beginning of the treatment the arms and legs only are done, then the rapid interrupter is used, applied to the neck and one heel for five minutes, and then for five minutes to the other heel. In a day or two the limbs are more fully treated with a slightly-increasing force of current, ending with the rapid interrupter, as before, also increased. Then, in a few days, the whole of the body, leaving out the head and hands, receives increasing muscle-stimulus, taking in the trunk pretty thoroughly, and, where there has been weakness of the back, spending a good deal of time on it. Rapidly done, this need occupy no more than forty minutes, and very soon the strength of the current may be considerably increased, and that without offending the patient at all.

This is an extremely useful means of systematically bringing out the activity of the muscles, in ways, too, that massage does not reach. It is chiefly a tonic to the muscular contractility, exerting, however, some little effect upon the circulation; but its chief value is to bring out the activity of the muscle-fibres, which may have for a long time been almost entirely disused. The rapid interrupter applied to neck and heels has a general effect upon cell-activity from pole to pole.

The Nurse.—I shall end this brief summary by some remarks upon the most important agent in its success, next to the physician himself,—namely, the nurse. It is almost impossible to get any sort of good result except with a thoroughly-competent nurse. Many times have I failed utterly in making shift with some one whose capacity as an amateur nurse had been amply demonstrated in acute illness. No amateur nurse will do here. Not only so, but to attempt rest treatment with the assistance of an old-fashioned Mrs. Gamp, or with a relative or friend, no matter how intelligent and angelically-tempered they may be, is almost certain to end in miserable failure. Nurses for such cases as this need to be of the very best. The first essential quality is tact; the second is firmness and always full knowledge of the craft.

I could dilate upon this interesting theme overmuch, but would, perhaps, only weary you. Of course the nurse must be skilful and thoroughly trained in hospital work, and must possess the highest qualities of heart and head of which she is capable. This shutting up of a person with a single nurse is, in some senses, worse than matrimony, and the peculiarities of

both patient and nurse must be carefully considered and adjusted by the physician. Much the larger number of cases requiring rest treatment are, of course, women; but where men are the patients it is usually best to have a woman nurse. The massage is given by a man, of course. There are very few good men nurses to be had, and perhaps it is just as well not. I firmly believe that a woman can control a sick man better than a man can, at least in the capacity of nurse. In most of the hospitals abroad men nurses are banished and only women used. Then, again, the class of men who will take up nursing is, as a rule, very unlovely. We all know of a few admirable exceptions to this, and some of the best men nurses I ever saw were colored or mulatto men. I had occasion to select a nurse for a patient who was himself a surgeon in the navy. When I asked him whether he would prefer a man or a woman, he promptly answered, "A woman, by all means; men nurses always smell either of hair-oil or whiskey;" and this is pretty much the case. There are men who need a male attendant for special and particular reasons, and it is very difficult to get the right man, I assure you. But woman's special vocation is to nurse, and if she has had the right kind of training, both morally and technically, it produces an exceedingly fine result, and it is my pleasure to testify in behalf of not a few splendid women who have taken up this career and who adorn it exceedingly, although their rewards, except in their own consciousness, are few.

THE TREATMENT OF GRAVES'S DISEASE.

THOMSON (*New York Medical Journal*, June 3, 1893), after discussing the treatment of Graves's disease, gives the following summary of his therapeutic measures.

His treatment of Graves's disease is mainly based upon its supposed relation to digestive disorders. In the first place, he believes that a meat diet is to be as much restricted in these patients as a starchy diet in diabetics. Fresh, undiluted milk also is not to be allowed, from its indigestibility with most healthy adults. It is a significant fact that races like the Tartars, the Bedouins, and the Guachos of South America, who have to live upon milk, have all found by experience that it has to be fermented before it can become a staple, and, as with them, about their only daily diet. All the world over, the ferment for this purpose is the same,—namely, the yeast plant. With fresh, good milk fermented every day, as it is by the Arabs and the peoples of Western Asia, and now sold here pretty extensively under the Turkish name of matzoon, Thomson states that he has relieved more cases of vomiting from organic diseases of the stomach than by any one article. In Graves's disease it has, in his experience, proved especially beneficial.

Medicinally it is well to begin treatment by a mercurial purgative, as the ordinary blue pill, to be repeated occasionally from time to time. In some patients this will be found particularly useful against the diarrhœa. Then, three or four times a day, he prescribes in capsule 5 grains of equal parts of bismuth subcarbonate and powdered calumba, with 4 grains of salol and 5 of benzoate of sodium; or capsules of 10 grains of bismuth salicylate with 2 of betanaphthol and 2 of ichthyol. The best time for these intestinal antiseptics to be taken is an hour after meals.

As a vaso-motor tonic, he relies chiefly on 10-drop doses of tincture of strophanthus half an hour before meals.

A CONTRIBUTION TO THE STUDY OF SYMPATHETIC OPHTHALMIA.

LOGETCHNIKOFF (*Wiestnik Oftalmologii*, January and February, 1893; abstracted in *Annales d'Oculistique*, April, 1893) observed a sympathetic serous iritis in a woman who had received two months before, a large traumatism of the right eye (wound in the sclerotic, rupture of the iris, with prolapse of the crystalline lens, ciliary body, and vitreous). Neither the right nor the left eye exhibited change, either in the optic nerve or in the retina. The sympathetic ophthalmitis at first progressed, then remained *in statu quo*, and finally disappeared without leaving a trace. The wound in the right eye healed well. This satisfactory result was obtained by means of relatively indifferent therapeutics,—atropine, antiseptic dressing, subcutaneous injections of pilocarpine. The duration of the treatment was six months and a half. This case, which is not an exception, leads Logetchnikoff to doubt the brilliant results obtained by Abadie in the treatment of sympathetic ophthalmitis by intraocular injections of corrosive sublimate. He likewise objects to cauterization of the wound with a thermo- or galvanocautery, which aids in the production of vicious scars. In a general way he is not an advocate of the theory of Deutschmann, or of any therapeutic measure based upon this hypothesis.

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Leading Articles.

THE TREATMENT OF CHLOROSIS BY IRON AND OTHER DRUGS.

ELSEWHERE in the Department of Progress in this number of the THERAPEUTIC GAZETTE we publish an exceedingly interesting article by Dr. Ralph Stockman, of Edinburgh, upon the "Treatment of Chlorosis by Iron." This subject has been so much disputed during the last few years that any contribution looking towards the solution of our doubts as to the action of iron under these circumstances is of value. Some of the points which are noted by Dr. Stockman are quoted in the address in Medicine which was published in the last number of the GAZETTE, but there are a number of others which we deem worthy of attention which we could not consider in that article.

In the first place, it will be noted that in all of the experiments of Dr. Stockman in which iron was used there was a very extraordinary increase in the quantity of hæmoglobin in addition to the increase which took place in the number of the corpuscles, and that the percentage of increase in hæmoglobin was far greater than the increase in corpuscles.

On the other hand, it will be seen that more experiments are needed than those given before the results obtained can be considered as conclusive, for it will be noticed that in all the experiments the length of time was so short that it is hardly credible that such an increase in corpuscles and hæmoglobin could have occurred. Particularly is this true of Experiment 9, which was made with bismuth and iron, in which it will be seen that the administration of 5 grains of iron thrice daily raised the number of corpuscles over one million in sixteen days, and again, in Experiment 10, it will be seen that an increase of one million took place in so short a space of time as four days under the influence of 3 grains of iron thrice daily. In Experiment 11, the statement that no improvement took place while the patient was under arsenic, but was marked under iron, is hardly correct. It is true that there was no increase in the quality or quantity of the blood under the arsenic, but the brief space of eleven days is hardly sufficient time to permit of the dogmatic statement that iron was responsible for the comparatively small increase which took place. Again, in Experiment 12 it will be noted that under the influence of ferrum redactum the corpuscles increased in five days, from October 30 to November 4, nearly eight hundred thousand, and that they dropped back in five days more than four hundred thousand. In Experiment 13 it will be seen that the use of iron in five days is supposed to have raised the corpuscles from two million nine hundred thousand to three million one hundred thousand, although four days before the iron was given the corpuscles numbered three million one hundred and twenty thousand.

We have drawn attention to these points not because we do not admire the research of Dr. Stockman, but because we believe that his experiments must be carried out further before we can receive his studies as conclusive. A certain amount of experimental work in studying the influence of drugs upon the blood has shown us that only prolonged and frequent examination of this fluid, governed by every control experiment possible, can prevent us from making serious errors. Particularly is this the case when it leads to the enunciation of so positive an assertion as that arsenic does

no good in chlorosis, either in increasing the number of red blood-corpuscles or quantity of hæmoglobin contained in them.

Practical physicians are almost a unit in the belief that arsenic does increase the number of the corpuscles, and that iron is a remedy which should be used to increase the quantity of hæmoglobin.

While it is true that arsenic did not increase the corpuscles to any extent in the experiments of Dr. Stockman, it is of interest to note that the iron in all cases produced a far greater increase in hæmoglobin than it did in corpuscular elements. This is particularly the case in No. 18, where the hæmoglobin was increased in thirteen days from thirty-five to seventy per cent., and again in Case 19, where the hæmoglobin was increased from forty to eighty-two per cent. in a little over five weeks.

THE VALUE OF VASO-MOTOR DILATORS IN CONDITIONS OF CARDIAC FAILURE.

IN the last number of the THERAPEUTIC GAZETTE we published a leading article upon the use of stimulants in cases of cardiac failure, and insisted upon the employment of vaso-motor stimulants if good results were to be obtained from drugs administered for the purpose of increasing the activity of the heart-muscle. It must not be thought from this recent article that we do not value a class of remedies which are capable of proving themselves very useful at certain times in the treatment of circulatory disturbances. Chief among these are the nitrites, which have been used, as is well known, by many eminent practitioners for the purpose of removing symptoms of cardiac failure in various diseases, and more particularly in pneumonia. It is claimed by those who have used them most that the relaxation of the blood-paths, which is caused by the employment of nitro-glycerin, takes away the resistance which, combined with cardiac weakness, is rapidly overcoming the power of the heart. It is also asserted that this dilatation of the peripheral blood-vessels through the use of the vaso-motor depressant enables the cardiac ventricles to rid themselves of the blood which, by rapidly accumulating, produces paralytic distention. While we do not believe that the employment of this class of circulatory depressants is as frequently indicated as is the employment of cardiac stimulants associated with vaso-motor excitants, there are certainly instances in which their employment is of value. These cases are usually found in those who are suffering from increased arterial tension due to renal disease, or who, in rapid pneumonia, have vaso-motor spasm as a result of interference with respiration and the accumulation of carbonic acid in the blood, which, as is well known, is a powerful stimulant to the vaso-motor centre.

In the employment of the nitrites as vaso-motor depressants in cases of cardiac failure, it should always be remembered that their dominant action is not only depressant to the vaso-motor system, but ultimately powerfully depressant to the heart itself. Their use is, therefore, limited to the producing of temporary vaso-motor depression, as they cannot be used for any length of time without endangering the integrity of the heart-muscle. Thus, in cases of continued inhalation of nitrite of amyl, it is conducive of nothing save disastrous result; whereas its employment for a moment, or the hypodermic injection of nitro-glycerin in a single dose, may, by its instantaneous relaxation of the peripheral blood-vessels, enable the heart to give those few beats which will empty its cavities and permit it to return to the performance of its customary duties. In the presence of sudden cyanosis, cardiac embarrassment, dyspnœa in the course of a fever, or pneumonia, the nitrites may prove invaluable; but, as we have just said, their employment should be temporary and not continuous.

PHLYCTENULAR KERATO-CONJUNCTIVITIS AND ITS TREATMENT.

AT the recent meeting of the Section of Ophthalmology of the American Medical Association, the subject of phlyctenular ophthalmia and its treatment was introduced by Dr. Dudley Reynolds, of Louisville, Ky., who contended that in the majority of cases of this affection local remedies were of minor importance, as the disease was the expression of malnutrition, and that the measures directed towards its relief should consist chiefly of proper diet and hygiene; in short, of all measures which tend to improve the constitution of the patient.

Considerable discussion was elicited by Dr. Reynolds's paper, although the subject is a well-worn one and the disease of such common occurrence. It at once became evident that while all were in accord that constitutional measures and due attention to hygiene and diet should be strictly enforced, few were willing to agree with Dr. Reynolds that local

measures should be relegated to the background.

One of the difficulties in laying down hard-and-fast rules for the treatment of phlyctenular ophthalmia, or, more properly, phlyctenular kerato-conjunctivitis, is the difficulty which always attends the formulation of therapeutic laws for a disease which manifests itself under a variety of types, just as it is brought into existence by a variety of causes. When the phlyctenulæ, always probably of conjunctival origin, confine themselves to this membrane, there is little cause for apprehension, and simple remedies, both local and general, suffice to bring about a cure, no matter whether the manifestations are multiple or solitary. When, however, extension to the cornea takes place, and when several of the etiological factors presently to be mentioned are active, the disease is serious, and phlyctenular keratitis may become one of the most stubborn of corneal affections.

Independently of the conjunctival forms, which are especially apt to follow in the wake of measles and other exanthemata, and may attack children ordinarily of fair constitution, the various corneal types of the affection are certainly most frequently seen in strumous subjects, particularly if to the influence of struma there are added unfavorable hygienic surroundings, improper and insufficient food, or indiscretions in diet. Under these circumstances removal of the city child to the pure air of the country, rigid exclusion of tea, coffee, sweetmeats, and all other improper articles of diet, together with the administration of alterative tonics,—iron, quinine, arsenic, phosphates, etc., —in large measure fulfil the therapeutic indications. We cannot believe, however, that they are sufficient, and enter a plea for local treatment as well. With the corneal disease, especially if the phlyctenule has broken down and formed an ulcer, there is almost invariably hyperæmia of the iris, and much is gained by dilating the pupil fully with atropine and maintaining the mydriasis so long as the signs of irritation remain. Subsequently the orthodox treatment with yellow oxide or calomel may be instituted. In case the phlyctenular ulceration assumes a tendency to spread or penetrate the corneal layers, then vigorous applications to check the disease are as evidently needed as they are in any other type of ulcerated keratitis with this disposition.

Too often, with this disease, a sort of routine practice is followed, and tonics are poured into the child without due preparation. Nearly always the alimentary canal is more or less disordered, and certainly this should be prepared for the reception and better absorption of the drugs which are supposed to build up the failing nutrition.

But even this is not sufficient. The tendency of the disease is to relapse. We are wont to say that it is under the influence of moist and warm weather, as well as of the circumstances which have been detailed, but we are not always so ready to acknowledge the influence of a factor that is quite as potent as either of these,—namely, the almost invariable association of inflammatory and obstructive diseases of the nasal passages, which, as it seems to us, in many instances constitute the direct cause of the disorder. Catarrhal rhinitis, tumefied turbinals, and particularly adenoid vegetations are so constantly present that they must be regarded as more than a mere coincidence or association, especially as their removal, in the majority of cases, is followed by almost immediate relief. This point has been insisted upon many times, and yet it is surprising that in many standard works there is complete silence in regard to the relation between phlyctenular kerato-conjunctivitis and nasal disease.

It is a fact worthy of mention that in many instances, as Martin declared a number of years ago, there seems to be a relation between keratitis of this type and astigmatism, —that is to say, children, other things being equal, appear to be attacked about the time that their habits of life are such that they begin to feel the strain occasioned by an astigmatic cornea. No doubt in these cases there is a predisposition to the disease, and the relation is somewhat similar to that which ametropia bears to blepharitis; but none the less it is another one of the many reasons for an early investigation of the refraction of the human eye, and one of the many justifications for an early correction of refractive anomalies. Certainly after an attack of phlyctenular keratitis has passed away, provided the child is of suitable age, astigmatism should be neutralized with suitable lenses.

The evident conclusion of the matter is that phlyctenular kerato-conjunctivitis, inasmuch as it may be an exceedingly stubborn affection, and may leave corneal scars which materially interfere with the vision and the future usefulness of the subject, demands both local and constitutional treatment; that everything which tends to remove malnutrition is indicated; that the lachrymal passages, the teeth, and the nasal chambers should be examined; in brief, to borrow an expression from Harrison Allen, that the entire cephalic mucous membrane

should be explored and anomalous conditions corrected; that the lesions in the eyes themselves require local treatment, soothing, stimulating, or resolvent, according to the stage of the disease; and, finally, that the relationship of ametropia should not be forgotten.

THE USE OF ORGANIC LIQUIDS EXTRACTED FROM GLANDS AND OTHER ORGANS.

BROWN-SÉQUARD, who more than twenty years ago enunciated as a general principle that all glands, whether they have excretory ducts or not, give to the blood by an internal secretion principles which are of great importance, if not necessary, has since proved, at least to his own satisfaction, that not only glands, but all tissues have, besides their influence on blood resulting from an interchange of nutrition, an internal secretion. This general truth is the foundation for his new therapeutic system.

In the *British Medical Journal*, there is a brief but very thorough *résumé* of the practical application of this principle. After describing the fluid used under these circumstances, the modes of introduction of the various organic liquid extracts are briefly discussed.

In addition to the thyroid gland, the thymus and the medulla of bone are said to have a therapeutic action like the thyroid after having been swallowed. This is not so, however, for the sexual glands or for the pancreas. Condensed liquid extract of these two glands may, however, be injected into the rectum with a beneficial effect almost as marked as would follow an injection of a smaller amount beneath the skin. The ordinary way of using these organic extracts is to drive them beneath the skin or into the blood. When the experimenter injects these liquids into the lungs through the laryngeal glottis, the absorption is almost immediate; there is no pain and no coughing, or trouble of any kind. This, Brown-Séquard states, is the safest way of injecting two, four, six, or eight drachms of organic liquid which are to be introduced into the blood, provided the medical man is sufficiently adroit for this delicate operation.

The mode of preparation of the liquid organic extracts is exceedingly important. This has been perfected by D'Arsonval. It is applicable to all the organic extracts. Taking, for example, the testicular extract, that which has been most widely advertised, most highly extolled, and most bitterly condemned, the method of preparation is as follows: Immediately after bulls are slaughtered a tight ligature is placed high up on the whole mass of the spermatic cord, thus retaining some blood in the veins; the testicles are removed, the coverings are cut away with sterilized scissors, the organs are then washed in dilute bichloride solution, afterwards in boiled water. Each testicle is then cut in four or five slices and, with the cord, is placed in glycerin, a litre to the kilogramme of testicle. In twenty-four hours a litre of freshly-boiled water containing ten to twenty-five grammes of pure chloride of sodium is added. This mixture is passed through filter-paper which has been previously sterilized with boiling water. The filtration will be more rapid if the glycerin is heated to about 104° F. A final sterilizing filtration through a D'Arsonval filter is practised, and the liquid is then ready for use. For a description of the method of preparing the organic extracts those of the various organs are taken up in turn and their physiological and therapeutic actions are pointed out.

Thus, injections of renal liquid in organic affections of the kidneys are supported on theoretical rather than practical grounds, and liquid extract of pancreas is suggested for the cure of diabetes, and hepatic liquid extract is suggested as a means of improving the condition of the patient suffering from advanced disease of the liver. Leaving out of consideration the various extracts which this eminent scientist prepares, and the administration of which he advocates in diseased conditions of the organs from which the extracts are derived, the theory upon which this system of therapeutics is based would seem to be the creation of a diseased imagination, were it not for the very positive clinical evidence afforded by at least one of these extracts,—that is, the active principle derived from the thyroid gland. This has been shown beyond all cavil to be curative in cases of myxœdema; and though this fact by no means forces us to the acceptation of the truth of Brown-Séquard's theory, it at least entitles the latter to careful consideration, and, under some restrictions, to practical tests.

Apparently, the testicular extract has been given a thorough clinical trial, and its failure is in striking contrast to the brilliant results obtained by the injection of thyroid extract. There have been a few reports of cures from injection of testicular juice.

Brown-Séquard has himself perhaps contributed the most striking cases. Others, and almost without exception those whose scientific

reputations are by no means on a plane with that of Brown-Séquard, have reported astonishing results. Wherever the method has received careful scientific study it has been found wanting.

Bardet (*Journal de Méd. de Paris*, No. 22, vol. v.), a therapeutic expert, has again gone carefully over the ground. His results were good only in that class of invalids who are always temporarily benefited by any new method; indeed, he implies that the testicular juice was practically as inert as so much water, and when the patient was kept ignorant as to which was injected, the water was followed by equally gratifying results.

Bardet draws a rosy picture of the coming day when all symptoms will be instantly cured by injection. He paints the exhausted neurotic sinking into the tranquil slumber of bounding health after transfusion of brain extract; the diabetic again becoming stout and lusty under subcutaneous administrations of pancreatic extract; the weak and debilitated bounding from excess of energy after the application of the active principle derived from macerated muscles; and, finally, the feeble old man regaining in a moment the spirit and powers of youth. This he characterizes as a beautiful dream, but so opposed to the recognized laws of dynamics and etiology that its realization can never be.

It is, perhaps, unfortunate, so far as a trial of his extract is concerned, that Brown-Séquard has made such extravagant claims for its therapeutic efficacy. He has seen testicular juice cure cancer of the stomach, leprosy, ataxia, and a long list of disorders as varied in their nature as they are hopelessly beyond the reach of medication.

It is a tribute to this distinguished scientist's high standing and to the good faith with which he advances his chimerical theories, that the French scientists not only refrain from that ridicule at which they are especially apt, but even subject the methods to careful scientific investigation.

The general principle is one upon which a school of medicine could readily be founded, and one having far more to support it than Hahnemann's dogma of *similia similibus*.

TREATMENT AFTER NEPHRECTOMY.

PICQUE (*La Médecine Moderne*, 4 année, No. 42) states that after nephrectomy the ureter should be treated precisely as the pedicle of an ovarian cyst after ovariotomy.

Monod states that drainage should not be suppressed altogether, especially when there has been pus in the kidney or in the pelvis.

Terrier agrees in this opinion.

Picque is content to carefully cauterize the pedicle as is done in cases of salpingitis.

This, Terrier holds, would only be safe in cases of tubercular pyonephrosis. If the ordinary septic microbes are present, such a proceeding would be extremely dangerous.

Reynier holds that ligation of the septic ureter does not secure immunity against infection of the womb, though cauterization of the section end is of assistance in attaining this object. If there is pus beneath the ligature the drainage of the latter is liable to be affected.

Reports on Therapeutic Progress.

CASE OF STRYCHNINE-POISONING, DEATH ENSUING UNUSUALLY LONG AFTER ONSET OF SYMPTOMS.

HENRY (*Australasian Medical Gazette*, March, 1893) reports that on the 27th of January he was called to see a man, aged forty-six, who had taken strychnine with suicidal intent. He lived close by, and within five minutes the man's hut was reached. The patient (a very robust and splendidly-developed man) lay on the floor in convulsions, most marked then about the lower half of the body. He stated that he had about three-quarters of an hour before taken "about as much strychnine as would lie on a shilling,"—a dose, probably, of 7 to 10 grains. He had poured it dry on his palm, then tossed it into his mouth, and washed it down with water. To more rapidly produce an effect he had refrained from taking breakfast. He had made his wife watch the act, and then ordered her, by threats, to wait by until symptoms began. He then sent her to a friend with a letter detailing his intention. This was given to the police about 9.15 A.M. As soon as possible 40 grains of chloral and a drachm of bromide per rectum was injected; then, after a little difficulty (caused by his voluntary resistance, for the jaws were not then affected) and thorough gagging, the pump was put to work. No food was present. The stomach was washed out about a dozen times until all the alkaloid unabsorbed was probably washed out. Soon after this the paroxysms became infrequent,—one short attack about every twenty minutes or half-hour. At eleven they increased in violence, and occurred about every ten minutes. Each one lasted from ten

to twenty seconds, and left him exhausted. About 11.15 a very severe and prolonged paroxysm occurred. He became perfectly livid, and was within an ace of suffocation. More chloral and bromide was administered. Shortly after this he fell into a deep chloral sleep.

For over an hour he was profoundly under the chloral and perfectly flaccid (having taken ninety grains in all). At 1.15 he awoke and talked freely, felt better, desired to recover, and was free from twitching. This was more than four hours after the symptoms had begun. At 2 P.M. the convulsions returned, and 10 grains of chloral given reduced them in force and frequency, but did not abolish them. At 4 P.M. his condition seemed satisfactory. He was given 30 grains of bromide at 4.30, as the signs of strychnine had returned more markedly. At 5.45, while conversing, he suddenly took a paroxysm very similar to one particularly referred to as occurring at 11.15 A.M. Opisthotonos was well marked; the legs were rigid and wide apart. Rapid asphyxia supervened in a few seconds, and on the spasm suddenly relaxing he was found dead.

Referring to the paroxysms, they did not occur more often when most frequent than every ten to fifteen minutes. A noticeable feature was the extremely sudden cessation of each fit. He would be writhing vigorously one moment, the clonic movements implicating apparently the whole body, and when the climax seemed at hand, without any gradation, the body would instantaneously become limp. His chief desire was to drink water and to be turned on his side, both procedures being carefully avoided by attendants. He perspired copiously, and had a premonition of the approach of each convulsion before it came.

The particular point of interest in this case is the length of time that elapsed between the onset of symptoms and death,—a period of at least eight and three-quarters hours. All the teachings and the standard works state in effect that once the symptoms of strychnine-poisoning commence, they progress rapidly either to recovery or death; that the poison is so quickly eliminated that if the patient live two hours his chance of recovery is good, and practically certain after four or five. Stevenson (Taylor, 11th ed.) gives five and a half hours as the longest period he had seen elapse before death; and both Taylor and Guy Ferrier (5th ed.) give six hours as the outside limit. Ringer (12th ed.) says, "In a fatal case death is rapid, but if the patient survive two or three hours sanguine hopes may be entertained of his recovery."

TREATMENT OF MYXŒDEMA WITH INTERNAL ADMINISTRATION OF THYROID GLAND.

DR. S. LAACHE (*Deutsche Medicinische Wochenschrift*, March 16, 1893) reports a very interesting case of myxœdema, which he treated successfully with the thyroid gland of the sheep and calf. The patient was a well-to-do baker, forty-nine years of age, happily married, but childless. He had never contracted any venereal infection, nor was he given to an excessive use of either tobacco or alcohol. No cause was known for his disease, which had come on gradually. At first he experienced weariness, headache, loss of memory, shortness of breath, palpitation. After an attack of influenza it developed more rapidly. His body swelled, the face, arms, and legs showing this especially at first. His voice became hoarse. For years his bowels had been very sluggish,—sometimes eight days elapsed without any passage,—and on this account he had long made use of various laxatives. Formerly he suffered much from rheumatism in the back, and he twice visited a sulphur spring for it. He came to place himself in Dr. Laache's care early in October, 1892. The patient, as shown in a picture of him, was then a gloomy-looking man, with very thin hair, beard, and eyebrows. His forehead appeared deeply furrowed and the whole face much swollen. To 1⅓ drachms of thyroid gland, chopped up, 30 drachms of pure glycerin were added, and at the end of twenty-four hours the preparation filtered. This was given in the course of a day. After five days the patient was feeling miserable, with headache, etc., and was put to bed, the thyroid juice being discontinued for a time. On the twelfth day it was resumed again, but now ¾ drachm a day was given in a watery decoction, with the addition of salt and bouillon. By the 29th of October his appearance was much improved, his voice was less funereal, and he spoke faster, but still complained of headache, dizziness, and lassitude. Early in November the thyroid treatment was again omitted for a few days. The dizziness and headache were only prevented by quiet rest in bed. The appetite improved. At the middle of November he was taking ½ drachm of thyroid chopped fine and with salt and pepper. Then the dose was further reduced to ¼ drachm every second day, and finally only every third day. From the 2d of December the improvement advanced steadily and rapidly, and on the 25th of January he was discharged cured. Laache finds it hard to account for the action of the dose. No change

in the patient's own gland could be noted. His hair grew again vigorously on face, head, and body. The picture of the cured man looks many years younger than he did when ill.

THE TREATMENT OF CHLOROSIS BY IRON AND SOME OTHER DRUGS.

STOCKMAN contributes to the *British Medical Journal* for April 29, 1893, and May 6, 1893, a paper upon this subject, from which the following is abstracted. After summing up the various theories in regard to the absorption of iron, he gives the following results, which we reproduce *in extenso:*

"It seems to me, also, that the question cannot be solved by these methods; the presence of iron in our food, in the tissues and secretions of the body, its constant ingestion and excretion, and the small quantities with which one has to deal, apparently place a complete barrier in the way of rigidly proving by chemical methods that it is or is not absorbed. It is certain that iron in organic combination can be absorbed and used to make hæmoglobin, for the child forms red blood-corpuscles from milk alone, and the chick from yolk alone, in both of which foods Bunge has shown that iron exists only in organic combination. Moreover, in healthy persons the wear and tear of the physiological iron is made up for from the food. It appeared to me that the matter would be most easily settled by making observations on anæmic patients, the observations being so contrived as to test the truth of the different theories.

1. If it be found that inorganic iron preparations given hypodermically will cure chlorosis, there can in such cases be no question of the iron exerting its effect by stimulation of the alimentary canal, or by combining with sulphuretted hydrogen in the intestines. It must be absorbed and utilized to make hæmoglobin.

2. If sulphide of iron cure chlorosis when given by the mouth, this alone would serve to disprove Bunge's theory. As previously stated, Bunge holds that the only use of inorganic iron is to neutralize sulphuretted hydrogen in the alimentary canal; but if iron sulphide be the form in which iron is given, the iron cannot take up any more sulphur, and is therefore useless as an absorbent of sulphuretted hydrogen. Ferrous sulphide is also non-astringent, and locally cannot stimulate the mucous membrane. If it cure anæmia it must apparently do so by being absorbed.

3. If bismuth, manganese, and other drugs—which are just as capable as iron is of absorbing sulphuretted hydrogen or of acting as intestinal stimulants—should prove inert in chlorosis, it forms an additional reason for regarding the absorption of iron as indirectly proved.

In this paper I wish to confine myself to questions bearing on the absorption or non-absorption of inorganic iron preparations, without entering into any questions as to the etiology of chlorosis and anæmia. I have for this purpose only used my observations on typical uncomplicated cases of chlorosis. They were all treated in hospital, and if they suffered from dyspepsia or constipation, were carefully dieted and purged. Otherwise they had no medicines except those stated in the reports of the cases. The hæmoglobinometer and hæmacytometer were carefully employed.

I.—IRON SUBCUTANEOUSLY.

CASE I.—Mill-worker, aged eighteen; ill for about three years, during which time she had taken iron frequently, with some temporary benefit, but had always had a relapse in a very short time.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Mar. 28	.....	3,620,000	44
Mar. 29	Citrate of iron and sodium in water, 6 minims subcutaneously = ¼ gr. Fe.	.....	...
Mar. 30	12 minims daily = ½ gr. Fe.....	.....	...
Mar. 31	.....	4,700,000	46
April 7	.....	5,820,000	52
April 10	.....	5,500,000	56
April 14	.....	5,600,000	66
April 17	.....	5,700,000	70
April 21	.....	5,650,000	72

She had in all twelve grains Fe. subcutaneously, and improved in every respect, just as if she had been taking iron by the mouth.

CASE II.—Mill-worker, aged fifteen; ill about a year; is a very pronounced case of chlorosis.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
April 23	.....	3,350,000	28
April 24	Peptonate of iron given subcutaneously, 10 minims daily = ¼ gr. Fe...	.....	...
April 27	.....	2,980,000	30
May 1	.....	3,600,000	34
May 4	Citrate of iron substituted, 10 minims daily = ¼ gr. Fe...	3,820,000	38
May 9	.....	4,020,000	42
May 14	.....	4,640,090	50
May 19	.....	4,490,000	60

The last subcutaneous injection was given on May 17. She got in all six grains Fe. in twenty-four days, and improved very rapidly. She was put on iron by the mouth to complete the cure.

CASE III.—Nurse-maid, aged sixteen; ill for two months. This is her first illness of the kind.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Jan. 30	.....	4,170,000	38
Jan. 31	Citrate of iron and sodium subcutaneously		
Feb. 3	= ½ or ¼ gr. Fe. daily.....	3,640,000	40
Feb. 7	.....	4,170,000	48
Feb. 11	.....	4,240,000	50
Feb. 21	.....	4,650,000	66
Feb. 24	.....	4,600,000	68

This patient had altogether 9.5 grains Fe. subcutaneously, and improved rapidly as soon as the iron was begun.

CASE IV.—Girl, aged twenty-three; ill for four years. Suffers severely from dyspepsia and constipation.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
April 17	Citrate of iron and sodium subcutaneously, 12 minims daily = ½ gr. Fe.	4,000,000	48
April 21	.....	4,200,000	50
April 27	¼ gr. Fe.....	4,440,000	56
May 1	.....	4,900,000	60
May 4	.....	4,900,000	70
May 15	.....	5,220,000	72
May 19	.....	4,900,000	74

She had eleven grains Fe. subcutaneously.

In all four cases the improvement was without doubt due to the iron. The total amount of Fe. administered in each case was comparatively small, and even all this is not utilized, as I invariably found iron in the urine. In no case did I observe any ill effects, except in Case IV., where the ½ gr. Fe. caused nausea and colic, which disappeared on reducing the dose.

On looking up the literature of the subject I found that there was abundant evidence that iron given hypodermically will cure chlorosis and anæmia; but it does not seem ever to have occurred to any one previously that this is a strong argument in favor of the absorption of iron. Rosenthal, Luton, Neuss, Glaevecke, Da Costa, Chiara, Mori, Alvazzi, Foà, Gauthier, Ciamarelli, Vachetta, Nasse, Huguenin, Goudran, and some others have all reported cases of anæmia and chlorosis which were successfully treated with hypodermic injections of various preparations of iron. Further, Vachetta has cured cases by injecting albuminate of iron into the peritoneal cavity, while Chalhoub has given it with success *per rectum*.

The evidence, therefore, is overwhelming that iron will cure some forms of anæmia without ever having had the opportunity of stimulating the alimentary canal or of neutralizing any possible sulphuretted hydrogen in the bowel. Iron given subcutaneously is now known to be stored up in the liver chiefly, from which it is slowly excreted into the blood, —probably in some organic combination,—and no doubt thus subserves the gradual necessities of the organism. It ultimately gets excreted into the bowel, but so gradually and in such small amount that it can have no influence on it or its contents.

Whether the hypodermic injection of iron preparations is a good and rapid method of curing chlorosis is another matter. Many of the above-mentioned authors report very favorably of its value in cases where iron could not be retained by the stomach, or seriously disturbed digestion. I must confess I have never met with a case of chlorosis where iron judiciously administered disagreed at all seriously with the patient's digestion. Quincke and Hirschfeld both object strongly to the pain caused by hypodermic injection; but if the solution be thoroughly neutral and the injection be made into the thick tissues of the back, it is not painful. None of my patients ever objected to it, and I never saw any worse effects than slight local hardness. The dose, however, which one can safely give is small, and recovery is probably more rapid on larger doses given by the mouth. One cannot give above ½ grain Fe., and even this is too much for some patients. There is also some risk of it irritating the kidneys (Glaevecke, Kobert), although I never saw the slightest trace of this. No preparation thoroughly satisfactory for hypodermic use has yet been proposed, and thus its exact value is somewhat difficult to gauge.

II.—SULPHIDE OF IRON.

To certain cases of chlorosis pure sulphide of iron was given under the same conditions as before,—namely, that the bowels were regulated by purgatives, but no other medicines given except those stated in the reports.

CASE V.—House-maid, aged twenty-two; ill for some months. Had a similar illness two years ago, which was cured by Blaud's pills. Appetite is poor, and there is severe constipation.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Jan. 22	Ferrous sulphide, 4 grs. thrice daily....	3,540,000	50
Jan. 26	.....	3,420,000	50
Jan. 30	.....	4,020,000	56
Feb. 6	.....	3,840,000	64
Feb. 11	.....	4,420,000	72

She now felt quite well and left the hospital.

CASE VI.—House-maid, aged twenty-four; ill for a few months, but has had frequent illnesses of the same kind since she was sixteen years old. She has no dyspeptic symptoms and only very trifling constipation.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Feb. 6	Ferrous sulphide, 2 grs. thrice daily....	2,110,000	32
Feb. 11	.....	2,200,000	38
Feb. 19	.....	3,140,000	44

The increase in these cases and in another was perfectly marked, but there is a fallacy in giving ferrous sulphide in this way, expecting it to reach the bowel unchanged. The hydrochloric acid of the stomach will convert it, in part at least, into ferrous chloride, which passes into the bowel in a form ready to combine with sulphuretted hydrogen. To obviate this objection, the ferrous sulphide was enclosed in keratin capsules. Such capsules (if properly made) are not affected by the gastric juice, but as soon as they reach the alkaline juices of the duodenum they dissolve and liberate their contents. Inorganic iron in the form of ferrous sulphide was thus introduced into the bowel, and it is thus incapable of absorbing more sulphuretted hydrogen, or of acting as a stimulant to the mucous membrane.

CASE VII.—Girl, aged nineteen; ill for four months; slight dyspepsia; no constipation.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Sept. 23	Ferrous sulphide thrice daily in keratin capsules...	4,520,000	48
Sept. 28	.....	4,320,000	48
Oct. 5	.....	4,280,000	60
Oct. 20	.....	4,800,000	60
Oct. 26	.....	5,340,000	84

CASE VIII.—House-maid, aged twenty; ill nearly a year; has been taking Blaud's pills without benefit; suffers from dyspepsia and constipation.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Oct. 7	Ferrous sulphide, 4½ grs. thrice daily in keratin capsules...	3,550,000	36
Oct. 17	.....	4,200,000	70
Oct. 26	.....	4,000,000	72

Both of these cases, therefore, recovered rapidly. It appears to me that this result alone is sufficient to disprove Bunge's theory that inorganic iron is useful simply by absorbing sulphuretted hydrogen in the bowel. Further, I have treated cases with small doses of reduced iron (¼ to ½ grain thrice daily), and they have recovered rapidly and satisfactorily. It can scarcely be supposed that such small amounts of iron would combine with sufficient sulphuretted hydrogen to make much difference in the quantity of that gas present in the intestines.

III.—BISMUTH AND OTHER DRUGS.

I treated several cases of chlorosis with bismuth oxide, subnitrate, and salicylate, but have only kept an accurate record of one. In no case was there any improvement effected in the blood condition until iron was substituted, when recovery took place rapidly. Bismuth is quite as capable as iron of absorbing H_2S in the bowel if that were all that is necessary for cure.

CASE IX.—Table-maid, aged nineteen; ill five months; suffers from pain after eating, and constipation.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Jan. 3	.....	4,000,000	55
Jan. 4	Bismuth oxide, 30 grs. four times daily	3,996,000	55
Jan. 7	.....	4,080,000	56
Jan. 8	Bismuth oxide, 30 grs. six times daily.		
Jan. 13	.....	4,008,000	54
Jan. 14	Ferrum redactum, 5 grs. thrice daily.		
Jan. 17	.....	4,768,000	61
Jan. 22	.....	5,088,000	67
Jan. 30	.....	5,016,000	78

Bismuth relieved gastric dyspepsia, but did no good otherwise.

The other cases got very varying doses, but all with the same unsatisfactory results. This is a further argument against Bunge's theory, because large doses of bismuth must absorb more sulphuretted hydrogen than the usual doses of iron, and thus, if Bunge be correct, should quickly cure chlorosis.

Certainly the balance of evidence is not in

favor of arsenic as a hæmatinic in chlorosis or in health. My own cases bear out this view. They were all treated in hospital, and were cases of typical chlorosis without any unusual complication.

CASE X.—Nurse-maid, aged seventeen; ill for three months; appetite good; no dyspepsia and no constipation.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Nov. 18	Liq. arsenicalis, 5 minims thrice daily after food.....	2,180,000	25
Dec. 1	.....	2,430,000	26
Dec. 7	.....	2,190,000	25
Dec. 12	.....	2,160,000	26
Dec. 13	Ferrum redactum, 3 grs. thrice daily.		
Dec. 17	.....	3,020,000	32
Dec. 21	.....	3,480,000	46
Dec. 24	.....	4,120,000	52
Jan. 4	.....	5,060,000	60
Jan. 7	.....	4,980,000	66
Jan. 22	.....	4,520,000	78

The blood in this case contained a very large number of undersized corpuscles, while many were pear-shaped, cucumber-shaped, and otherwise badly formed. The arsenic agreed perfectly, but during its administration no change for the better took place either in the blood or general condition. Both began to improve almost at once when iron was substituted.

CASE XI.—Table-maid, aged twenty; ill for nine months, during which time she has been taking iron almost constantly, but has only improved slightly and temporarily.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Oct. 21	Liq. arsenicalis, 5 minims thrice daily	4,480,000	44
Oct. 26	.....	4,220,000	42
Oct. 30	.....	.....	44
Nov. 4	.....	3,940,000	42
Nov. 9	.....	4,200,000	42
Nov. 10	Ferrum redactum, 2 grs. thrice daily.		
Nov. 16	.....	4,250,000	50
Nov. 21	.....	4,650,000	55

She left hospital, but continued to take iron. Here also no improvement in the blood or otherwise was observable while she was taking the arsenic, but it became at once marked on iron being given instead.

CASE XII.—A domestic servant, aged twenty; ill for several months; has the usual symptoms of chlorosis, with a good deal of gastric dyspepsia, but no constipation; has been treated with Blaud's pills without benefit.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Oct. 6	.....	4,340,000	48
Oct. 8	Liq. arsenicalis, 5 minims thrice daily after food.....	4,600,000	48
Oct. 13	.....	4,500,000	46
Oct. 16	.....	4,580,000	46
Oct. 21	.....	4,500,000	46
Oct. 27	Ferrum redactum thrice daily.....	4,240,000	42
Oct. 30	.....	4,720,000	50
Nov. 4	.....	5,220,000	56
Nov. 9	.....	4,910,000	66

She continued to improve on iron. The small and misshapen red corpuscles, which were very numerous on admission, began to diminish in number only after beginning the iron.

CASE XIII.—House-maid, aged sixteen; ill for seven months, during which time she has taken three gross of Blaud's pills, but without much improvement. A year ago she had a similar illness, which was cured by Blaud's pills.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
June 13	Liq. arsenicalis, 2 minims thrice daily	2,740,000	32
June 19	Liq. arsenicalis, 4 minims thrice daily	3,540,000	34
June 23	.....	3,350,000	33
June 29	Liq. arsenici hydrochlor., 8 minims thrice daily.....	3,120,000	33
July 3	.....	2,900,000	34
July 4	Fer. Malesci, 20 drops daily.....	3,100,000	34
July 15	.....	3,680,000	40
July 20	Fer. Malesci, 30 drops thrice daily.....	4,360,000	43
July 27	.....	4,160,000	50
July 30	.....	4,200,000	53

She went to the country, still taking iron, under which she completely recovered, but had a relapse about six months afterwards.

CASE XIV.—Dress-maker, aged twenty-one; ill for four months. In this case the arsenic had not a fair chance, as the patient suffered greatly from gastric dyspepsia and slight feverish attacks. In consequence it was not given quite regularly. On admission, May 19, she had 4,960,000 red corpuscles and sixty-six per cent. hæmoglobin; on June 19 she had 4,740,000 red corpuscles and sixty-six per cent. hæmoglobin. During this time she was taking liq. arsenicalis in 2- to 5-minim doses, generally thrice daily, and the corpuscles and hæmoglobin oscillated somewhat, but this I attribute rather to her dyspepsia, headaches, and feverish attacks than to the arsenic. As soon as she

was put on saccharated carbonate of iron, 10 grains twice daily, the blood condition improved steadily and uninterruptedly.

Five cases is not a large number, but the results are supported by those of other observers, as previously mentioned; and besides, the uselessness of arsenic was so obvious in the appearance of the patients that it seemed quite unnecessary to increase the number. The immediate improvement when iron was substituted for the arsenic was most striking. My cases show no reason to suppose that either the red corpuscles or the hæmoglobin are increased by the administration of arsenic in chlorosis. They were all under the most favorable conditions for recovery, their diet and bowels were carefully attended to, and they had complete rest in bed or very gentle exercise in the hospital garden, but not one of them showed any material improvement. In four cases the hæmoglobin was not affected up or down beyond one or two per cent., which is within the limits of error of observation, and, even if correct, is an unimportant variation; in Case XII. it fell six per cent., there being no apparent reason for this, as the arsenic agreed well. Nor were the corpuscles affected, except in Case XIII., where a rise apparently took place at first, but was followed by a fall. Whether this was a real change or simply due to the admitted inaccuracy of the method of counting corpuscles I am unable to say. In no case did arsenic improve the irregularities in size and contour of the red blood-corpuscles. My own opinion is that it exerts no direct influence on the blood in chlorosis.

Whether it has an indirect value in chlorosis when given in combination with iron is very difficult to say. I have several times attempted to compare the relative rapidity with which cases treated with iron alone and iron plus arsenic recover, but it is impossible to do so satisfactorily, for the simple reason that apparently similar cases vary much in the time taken for recovery under the same treatment. In so far as it acts as a gastro-intestinal tonic, arsenic may improve appetite and digestion, and thus indirectly assist in the cure; but if it irritates and lessens appetite it will exert a contrary effect; in fact, certain writers state expressly that they never give it along with iron in chlorosis, because it is apt to disturb digestion. I myself have seen this in several cases, which did much better when arsenic was omitted from the prescription. However, it usually agrees well enough when given in small doses.

The only other point which occurs to me in this connection is one largely, if not purely, theoretical. Arsenic is credited with lessening tissue metabolism, and thus diminishing the amount of oxygen required in the body. In chlorosis the breathlessness is due partly to the lessened oxygen-carrying capacity of the red corpuscles. Arsenic, by diminishing the demand of the tissues for oxygen, may decrease the breathlessness of the patient, and thus add to her comfort. The view, however, which I wish to emphasize here is that arsenic, if it act beneficially at all in chlorosis, does not do so by any direct effect in increasing the number of the red blood-corpuscles or the quantity of hæmoglobin contained in them.

I have treated several cases of chlorosis with the binoxide and sulphate, and never saw the slightest improvement result. Only two of them were kept in hospital, but the failure of manganese to cure chlorosis was so marked that it seems sufficient to report one case.

Case XV.—Girl, aged eighteen; ill for three years, during which time she has been treated with many kinds of iron preparations, but only improved slightly and transiently.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
May 15	.....	2,425,000	26
May 16	Manganesii oxid. purif., 10 grs. twice daily.		
May 22	.....	2,750,000	26
May 28	.....	2,420,000	26
May 29	Ferri carb. sacchar., 10 grs. twice daily.		
June 2	.....	3,020,000	30
June 8	.....	4,100,000	46
June 13	.....	3,880,000	52
June 16	.....	4,340,000	60
June 23	.....	4,580,000	72
June 29	.....	4,660,000	78

In a fortnight absolutely no improvement was made on manganese, while the substitution of iron increased the corpuscles and hæmoglobin materially in five days. I never found manganese in the urine.

Hydrochloric Acid in Chlorosis.

Zander, arguing that the iron of the food is sufficient for the cure of anæmic conditions, and that this iron is not absorbed, owing to the deficiency of the digestive juices, has used hydrochloric acid to make up this deficiency and improve digestion. He gives no exact particulars, but states that he has treated many cases of chlorosis with hydrochloric acid, sometimes with pepsin in addition, and that he has thereby obtained more satisfactory results and more lasting cures than by the iron treatment. I have been unable to confirm Zander's re-

sults. Two cases only were treated with acids, but as these made absolutely no improvement, or rather as both became worse, I thought it waste of time to pursue the matter further. Whether hydrochloric acid may not be a useful adjuvant to iron in treating the dyspepsia of chlorosis is another matter, but the attempt to determine its value exactly is met by the same difficulties as I have stated at length under arsenic. It certainly does not improve the blood condition.

CASE XVI.—Girl, aged twenty-five; ill for two months, but has previously had several similar illnesses. In addition to the acid she had saline purgatives or an enema daily, as there was marked constipation.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Nov. 1	Acid. hydrochlor. dil., 10 minims thrice daily in water after food	3,700,000	36
Nov. 9	Acid. hydrochlor. dil., 15 minims thrice daily.....	3,457,000	36
Nov. 16	.....	3,430,000	33
Nov. 17	Ferri carb. sacch., 10 grs. thrice daily.		
Nov. 21	.....	3,500,000	34
Nov. 23	.....	4,457,000	40
Nov. 28	.....	4,000,000	48
Dec. 5	.....	4,500,000	62
Dec. 7	.....	4,700,000	76

CASE XVII.—Domestic servant, aged eighteen; ill for some months; appetite and digestion good.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Nov. 11	Acid. hydrochlor. dil. after meals.....	2,987,000	34
Nov. 21	.....	3,010,000	38
Dec. 6	.....	3,000,000	30

She afterwards improved on iron.

In both cases the acid agreed perfectly well, but the blood deteriorated during its administration.

Dr. Hale White has practically settled this question. He treated five cases with hydrochloric acid, and found that the increase of corpuscles and hæmoglobin was trifling, no more, in his opinion, than complete rest and full diet might account for.

I have treated five cases in hospital on Sir Andrew Clark's plan, omitting the iron. In the first case, after eleven days' treatment, there was two per cent. diminution in the hæmoglobin; in other two cases, after eleven and twenty-one days, one per cent. diminution; in another, after fourteen days, there was a loss of four per cent.; and in the fifth, after fourteen days, a gain of four per cent. hæmoglobin. The addition of iron caused a rapid improvement in them all. I have besides observed several cases outside the hospital, and never found that improvement took place until iron was given in addition to, or in place of, the purgatives.

The same is true of purely dietetic treatment, either alone or combined with out-door exercise or rest in bed. Hollis found that a week's rest in bed only caused an average increase of one per cent. of hæmoglobin; Graeber, that improvement ceased whenever he stopped iron, and then began again when iron was resumed. This accords entirely with my own results in several carefully-observed cases. To regulate the bowels and to use a nutritious and digestible dietary are general rules of living both in health and sickness; they contribute greatly to bodily comfort and well-being, but they cannot be regarded as specific for the cure of anæmia, or more valuable in it than in many other morbid conditions.

Many cases do not begin to improve on iron until they have rest in bed. This is matter of common experience, and I have frequently found it occur. It is impossible to discuss the reason in this paper, as it would carry us far beyond its assigned scope.

BEST FORM OF ADMINISTRATION AND DOSE OF IRON.

At present this is largely a matter of opinion; different practitioners use different preparations, apparently with equally satisfactory results. Formerly the astringent preparations were most in fashion, now it is the milder preparations and protosalts. No proof has yet been given that any one preparation of iron cures chlorosis more quickly than another, and we shall probably make little progress in this direction until we know more about the form and conditions of absorption. Hayem holds the oxalate to be most satisfactory, while others think they get the best results from the protochloride, carbonate, perchloride, double salts, etc. Meanwhile, it seems most rational to use those preparations which disturb digestion least. Latterly I have employed chiefly reduced iron and freshly-prepared carbonate. Frequently, if there be gastric dyspepsia, 1 grain of reduced iron along with bismuth sub-

nitrate agrees perfectly well if given before food.

As regards dosage, there is a general idea that very large doses give the most satisfactory results, but on looking over the literature I find that large doses of iron have often been protested against on the ground that they tend to disturb digestion, and also that small doses act equally well. I am not yet able to express any decided opinion on this point, but latterly I have been using much smaller doses (½ to 2 grains of reduced iron or carbonate of iron twice or thrice daily), and find that the cases recover quite satisfactorily.

Of one thing I feel convinced,—namely, that in chlorosis the ordinary inorganic preparations of iron cure much more quickly than organically-combined iron does. Patients fed on even a rich and varied diet, containing plenty of organic iron, do not, as a rule, recover until inorganic iron is administered. I have tested this frequently, and have no doubt it holds good in the great majority of cases, although some cases of chlorosis do recover spontaneously and without any treatment,—that is, on the iron of the food alone. From an experiment of Subbotin's it does not seem to be the case that a diet rich in organic iron causes a high percentage of hæmoglobin, although one would have expected it to be so. He fed two pigeons on yolk of egg for twenty-six and thirty days respectively, but at the end of that time their hæmoglobin was considerably less than that of two pigeons which had been fed on grain. Now yolk of egg is particularly rich in organic iron.

Blood given subcutaneously (Ziemssen, Silbermann) or by the stomach (Benczur) will cure anæmia; but Gherardini has shown that it is extremely indigestible, that the hæmatin is very partially absorbed, and that it is a very undesirable form in which to give iron. In persons with weak digestion it does harm. Kobert agrees with this; but as he is strongly of opinion that organic iron only is useful in chlorosis, he has prepared from blood two substances, which he calls hæmol and hæmogallol, and which contain all the iron of the hæmoglobin in organic combination. They are insoluble brown powders, tasteless and unirritating. He finds that this iron combination is readily absorbed from the intestinal canal, and states that it is a successful method of treating chlorosis. Two cases, however, treated with these preparations did not give me very encouraging results.

CASE XVIII.—Domestic servant, aged twenty-two; ill for about six months.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
Feb. 20	Hæmol, 5 grs. thrice daily.....	2,700,000	34
Feb. 29	.....	2,720,000	35
March 1	Hæmogallol, 10 grs. thrice daily.....	2,720,000	33
March 5	Ferrum redactum, 2 grs. thrice daily.		
March 11	.....	3,110,000	35
March 15	.....	3,080,000	42
March 23	.....	4,100,000	60
March 28	.....	3,900,000	70

She had one hundred and fifty grains of hæmol and one hundred and twenty grains of hæmogallol in a fortnight without the slightest benefit, while reduced iron improved her condition at once.

CASE XIX.—House-maid, aged eighteen; ill for some months.

Date.	Medicines.	Red corpuscles.	Hæmoglobin. Per cent.
May 2	Hæmol, 10 grs. thrice daily	3,700,000	40
May 18	Ferrum redactum, 2 grs. thrice daily...	3,800,000	44
May 25	.....	4,200,000	54
June 13	.....	4,930,000	72
June 29	.....	4,500,000	80
July 9	.....	5,100,000	82

In this case four hundred and eighty grains of hæmol were taken in sixteen days, but the benefit was very trifling.

One of the great problems in the study of chlorosis is to determine why the patient should not be able to renew the iron of the blood from the abundant iron of the food. Cases of acute hemorrhage are generally able to do so, a few cases of chlorosis do so, but the great bulk of the latter only recover when inorganic iron is given. I have already stated my opinion that (for some as yet unknown reason) inorganic iron is much more helpful towards recovery than organic iron, although in health the latter serves perfectly for the manufacture of hæmoglobin, and is the only form in which iron is ordinarily taken by mankind.

Another point of great interest is to determine the reason why inorganic iron administered to the healthy in no way affects the number of red blood-corpuscles or the amount of hæmoglobin. We have absolutely no knowledge as to how the use of iron by the organism is regulated, but it seems impossible to increase the number of corpuscles or the amount of hæmoglobin above a certain fixed normal. These and other matters must be left for future research.

In conclusion, I wish to touch on one other

matter. It has been often stated that in chlorotics the amount of hæmoglobin is small, and that it is impossible to raise it above a certain point, which is lower than the normal average; and it is pointed out that cases of chlorosis after treatment have seldom more than seventy to eighty per cent. of hæmoglobin (Gowers's hæmoglobinometer). The following explanation of this has been given, and seems to me the true one. During an attack of chlorosis a large number of pale red blood-corpuscles are formed, very deficient in iron. These die out only slowly, and it takes weeks, or even months, before they are quite replaced by the newly-formed corpuscles rich in iron. As the pale corpuscles become less and less numerous the hæmoglobin percentage gradually goes up to the normal. In women, however, its normal is only about from eighty-two to eighty-eight per cent. on Gowers's hæmoglobinometer, and, so far as my experience goes, one hundred per cent. of hæmoglobin is not very common even in healthy men. Leichtenstein states that women from eleven to fifty years of age average eight per cent. less hæmoglobin than men. By the use of iron, therefore, we can scarcely hope to bring the blood of chlorotic women up to one hundred per cent. of hæmoglobin, but by a little persistence in treatment we can readily bring it up to between eighty and ninety per cent., which is the average for healthy young women."

DEATH FROM POISONING BY EUCALYPTUS.

NEALE (*Australian Medical Gazette*, April, 1893) reports a rare case of poisoning by eucalyptus, which ended in the death of the patient. The case was as follows:

V. B., aged ten, stated to be poisoned with eucalyptus oil. On arrival the author found him dying; lips and gums colorless; chest and neck rigid; the breath coming in gasps; and the pulse too feeble and rapid to count. He died in twenty minutes.

The history was that several of the family had colds; that at nine o'clock on the previous evening the boy, who was quite well, took some blue-gum oil as a preventive, stating the same to his father, and went to bed. In a few minutes the father was attracted by his gasping for breath, and went to him, when the boy vomited heavily. This relieved him, and he breathed well for about an hour, when gradually the struggle for air came on again, and increased until his death, fifteen hours after the ingestion of the oil. There was no purging; only one vomit; no convulsion. He got out of bed once after he had vomited to take a drink of water. He spoke rationally several times up to within an hour of death; once complained of pain in the right axillary line above the liver; relieved at once by a poultice.

The inquest showed that a little over half an ounce had been taken, and that nothing else could have been taken.

The court adjourned for an hour to enable Dr. Neale to open the body, and the appearances were as follows: Forty-eight hours after death post-mortem congestion was well marked over the whole back and neck and on back and front of all limbs; the abdomen and loins were greenish; no corrosive marks in mouth or pharynx; stomach much distended with gas (foot in length), and on perforation collapsed to less than a third. It contained a small quantity of thick, yellow, odorless fluid (kept for examination). The outer surface white, except for a staining where it adjoined the spleen; inner surface white, thickened, and puckered, as if painted with a mild solution of carbolic acid; not brittle; liver, spleen, kidneys, and bowels healthy. Pleural cavities contained a quart of serous blood; serum not flocculent; no lymph on pleuræ, nor thickening; both lungs collapsed, firm, and bloodless, colored in large patches of pink and white, except posteriorly, where stained with pleural fluid. Right heart contained frothy liquid; the left empty and contracted; the brain soft and pulpy, the membranes only being full of blood.

Since the inquest the author has heard of several authenticated cases where serious symptoms have followed a dose of 1 drachm of eucalyptus oil, in all instances with catching of the breath, and followed by recovery.

Martindale quotes that 80 minims may be taken in two and a half hours, and that it is not so poisonous as carbolic acid. I cannot find any instance reported of death following any dose.

The particular oil was Miller's brand, made in the neighborhood, and of good repute.

This is a case of very great interest, as it raises the question of the toxic effect of large doses of eucalyptus oil.

We know of no recorded cases of poisoning by this drug, if we except one reported early in March by Dr. Croker at Geelong, in which a dose of an ounce is said to have accelerated the death of a book-maker named James Noonan. The description given of the post-mortem appearance of the stomach supports the

view that a dangerous quantity of the oil had been taken. The amount of pleuritic fluid was undoubtedly great, but from the description given it appears to have been recently effused. Crucial experiments should be made to determine the toxic power and mode of deleterious action of this frequently-used drug.

A FATAL CASE OF MYXŒDEMA WHICH HAD BEEN TREATED BY THE USE OF THE THYROID GLAND.

In the last few numbers of the THERAPEUTIC GAZETTE we have published abstracts of articles in our Progress columns which detailed instances where the administration of the thyroid gland of a sheep in one form or another seemed to produce amelioration, if not a cure. In the number of the *Edinburgh Medical Journal* for May, 1893, there are several cases of myxœdema recorded by various authors, which have been treated by the use of thyroid glands, and also a paper upon the treatment of sporadic cretinism by thyroid glands. There is, however, in addition, a paper by Dr. John Thomson, who briefly details the case of a woman, aged fifty-one years, who presented well-marked, but not severe, symptoms of myxœdema. The symptoms had developed very gradually, she having been ill more than ten years. The case is fully reported in Bramwell's "Atlas of Clinical Medicine," vol. i., plate 3. Death occurred suddenly just after she had risen to an erect posture. Dr. Thomson remarks that, while the state of the heart-muscle which was found in this case was amply sufficient to account for the fatal syncope, one can scarcely doubt that the thyroid treatment may possibly have had some influence in hastening the end. The dose of the thyroid was certainly small (2¼ thyroids in three weeks), but still it had already demonstrated the activity of its action by the very marked effect it had produced on the subcutaneous swelling.

The lesson which the case teaches is, not that we should refuse to treat patients with unsound hearts, but that our precautions in such cases should be more stringent. The dose should be much smaller than in more robust cases. The patients should be confined to bed from the beginning of the treatment, and means should be taken to insure that directions as to complete rest and the recumbent position are more strictly carried out than they, unfortunately, were in the case of this patient.

A SPECIAL FORM OF OPHTHALMIA TO WHICH HOP-PICKERS ARE LIABLE.

PERCY T. ADAMS (*British Medical Journal*, May, 13, 1893), in a very interesting paper, describes a form of ophthalmia to which the hop-pickers are liable. The symptoms are those of an acute conjunctivitis, sometimes with œdema or muco-purulent discharge, and often keratitis and hypopyon-keratitis. He noted the apparent immunity of men to this disease as compared with women and children. The disease is sporadic, and associated, so far as his observations go, with no particular plantation of hops. The article then proceeds to discuss the general considerations as to its etiology, referring to the irritating substances which are used in the cultivation of the hops, and then takes up the chemical constituents of the hop-plant, and gives the result of its microscopical examination. Referring to the probable mode of the production of this ophthalmia, he writes as follows:

Belonging, as the humulus lupulus does, to the same family as the *urtica urens*, or common stinging nettle, and the order *urticaceæ*, which also includes some very severely stinging foreign specimens, and knowing that the hop-plant possesses sharply-pointed appendages, it is not improbable that this painful affection, which is produced immediately and often continues to become worse, is explained by the introduction, either by movements of air, by gravitation, or upon the hands of the hop-pickers, of some of the spinous processes of the hop-plant, which, becoming impacted in the conjunctiva or the cornea, form the initial cause of the disease. It is also probable that upon them the volatile and resinous matters, etc., of the hop itself, or even micro-organisms, are introduced, which modify the subsequent features of the disease.

The treatment varies according to the degree of severity of the disease. If purely conjunctival, sedative lotions and irrigation of the conjunctival sac, combined with hydrochlorate of cocaine, are most efficacious. In the more severe cases, the local application of a belladonna lotion in the form of a graduated and saturated compress, the artificial leech, and the administration of a grain or so of calomel internally are to be recommended.

THE STERILIZATION OF OPHTHALMIC SOLUTIONS.

SYDNEY STEPHENSON (*Medical Press and Circular*, May 3, 1893), referring to the flasks recently introduced by Dr. Stroschein (see ab-

stract, THERAPEUTIC GAZETTE, January, 1893), writes as follows:

The flasks, of elegant shape and admirable construction, are made of thin glass, so as to bear heat without breaking. Each consists of two parts,—namely, a pipette and a bottle to hold the solution. The pipette—traversed, of course, by a central channel—is capped by an India-rubber nipple, which can be removed at pleasure. It fits into the bottle. In order to sterilize the contained solution, the nipple is removed, the pipette reversed and inserted into the bottle. The whole apparatus, supported by wire gauze on a tripod, is then boiled over a small flame—*e.g.*, that of a spirit-lamp—for three minutes. As soon as boiling-point is reached, steam arises from the liquid and passes through the pipette, which is thus effectually sterilized. Thirty seconds after removal of the bottle from the flame the pipette is inserted in its original position, and the India-rubber nipple having been replaced, the bottle and contents are ready for employment. If the bottle is in constant use, sterilization must be repeated, of course, at intervals of a few days. It is obvious that such boilings will concentrate the solutions, but this difficulty is met by the addition of eight to ten drops of distilled water to each twenty cubic centimetres of the liquid before boiling.

Everybody knows that the solutions employed in ophthalmic work rapidly undergo changes, one of the most constant of which is the development of a fungoid growth. Consequently, solutions soon become unfit and have to be thrown away. One has endeavored to prevent the onset of these changes by using as the menstruum camphor-water instead of ordinary distilled water, or by adding antiseptics, such as salicylic or boric acids, to the solutions. But these various means do not, in his experience, attain the desired result. On the other hand, sterilization of solutions in the way described above will certainly prevent the appearance of any fungoid growth. The fact should perhaps be mentioned that a series of more than one hundred bacteriological experiments conducted by Dr. Stroschein bear evidence as to the completeness of the sterilization attained by his method. Dr. Stephenson has used Stroschein's bottles extensively during the last few months, and finds that the method recommended is as admirable in practice as it is sound in theory.

Boiling does not seem to impair the physiological action of atropine, cocaine, physostigmine, or homatropine solutions in any way. Presumably, therefore, the chemical characters of these agents remain unchanged by heat.

The bottles vary in color according to the solutions they are intended to contain. Thus, the bottle for cocaine is white, that for atropine black, for homatropine blue, and for physostigmine red. The name of the contained solution is indelibly etched upon the face of each flask.

TEN YEARS' EXPERIENCE IN CATARACT OPERATIONS.

FREELAND FERGUS (*British Medical Journal*, April 18, 1893) contributes his experience in cataract extraction during the last ten years. He rarely makes a downward section, and rarely a preliminary iridectomy. His objections to preliminary iridectomy are: 1, two incisions must of necessity give us more corneal astigmatism than one; 2, by a preliminary iridectomy we run twice the risk of infection of the wound; 3, a patient dreads an operation, and there is nothing to be gained in submitting him to two operations where one is sufficient and equally good.

In regard to the size and site of the section, he endeavors to make the puncture and counter-puncture in the apparent corneal margin at such a distance from what he calls the superior horizontal tangent to the cornea as will allow of a two- or three-millimetre flap, and still permit his finishing the section well in the cornea. But he regards the exact position and even the size of the wound only of secondary importance.

In preparing for the operation, the instruments are immersed in a 1 to 30 solution of carbolic acid for at least an hour. They are then carefully dried and placed in a metallic box. They are again immersed in carbolic solution just before being used. The ordinary cleanliness of the operator, patient, and assistants is properly attended to. At the time of the operation the patient's face is thoroughly drenched with a 1 to 10,000 solution of bichloride of mercury, special attention being given to the cleansing of the conjunctiva in all its parts. With proper precautions, he does not consider blennorrhœa of the sac a contra-indication. For cleansing after the operation, a solution of boracic acid is preferred. He is very careful to prepare the cocaine solution with boiling water, and does not use a dropper to instil it into the eye.

He prefers to rupture the capsule before iridectomy is made, using a sickle-shaped scratcher, the incision being in the form of the letter T, the horizontal portion corresponding with the upper part of the capsule. He

thinks this combines the advantage of Knapp's capsulotomy with a freer opening for the lens.

Even if the iris has perfectly returned to the anterior chamber, he prefers to make iridectomy. In expelling the lens, he performs all manipulations with instruments. His dressings consist of gamgee tissue fastened by strips of adhesive plaster, or else by an ordinary cataract bandage. Generally speaking, the eyes operated on are dressed every day; sometimes nearly a week elapses.

He describes congenital and traumatic cataracts together, and thinks three forms of operation are justifiable,—namely, iridectomy, when the entire lens is not involved, so as to make a pupil in front of a clear portion of the lens; repeated discissions, or needling; and maceration with extraction. His own preference is for the last operation, concerning which he writes as follows: The best way of treating congenital cataracts consists in dilating the pupil thoroughly, and then dividing both the capsule and the lens very freely—and the younger the patient the freer—with a Bowman's or Jacobs's needle. The patient is carefully watched. If nothing unusual happens, the lens is allowed to macerate for some days, but never longer than a week, and then the pupil is again dilated and the lens drawn off. This is easily done by an ordinary or, perhaps better, a straight keratome, which is thrust through the cornea, and the lenticular matter allowed to escape along its surface.

He thinks that preliminary iridectomy, to which he ordinarily objects, is justifiable to hasten the maturity of the lens. If glaucoma and cataract coincide, then, provided the light-sense is fair, an iridectomy is made, and afterwards the case treated by extraction. If the lens is not ripe, the iridectomy is a preliminary operation. He makes the iridectomy in that portion of the iris which responds best to eserine. He very properly urges the correction of astigmatism after cataract extraction, and praises the value of Javal's ophthalmometer for determining this.

He concludes by the statement that not a single case of extraction has gone wrong in his hands in private practice. The only ones that he has lost have been in the hospital. He has never had, in private or hospital practice, a case of acute plastic iritis ending in closed pupil, nor a case of sympathetic ophthalmitis in the other eye. Both of these conditions he regards as septic and therefore preventable.

[It is to be regretted that this paper, which appears as an abstract of one read at the Glasgow Southern Medical Society, does not give the number of cases of cataract on which Dr. Fergus has operated during the past ten years, and a tabular statement of the visual acuity which he has secured.—EDITOR.]

RADICAL CURE OF STRICTURE OF THE NASAL DUCT.

DR. SAMUEL THEOBALD (*Canadian Practitioner*, May, 1893) states that fifteen years ago he called attention to the ineffectual use of small probes in the treatment of lachrymal stricture, and to-day that, while using larger probes than formerly, the majority of the profession are not employing as large ones as he does. In order to test whether it is practicable to insert large probes, he has examined a number of large skulls and cadavers. In his experiments on dry skulls, he found that in seventy ducts probed the average size was 4.7 millimetres in diameter. He believes it is easier to pass large probes in the cadaver than in the dry skull, because there is more give to the tissues and more force can be used than is possible in the dry skull without breaking the bones. In ten subjects examined, he found the average size of the duct to be 4.7 millimetres in diameter, the largest being 7 millimetres and the smallest 3 millimetres, which is equal to a No. 12 probe. He believes that large probes should be used, because the smaller ones do not produce permanent benefit. After an experience of fifteen years with large probes, he says that he approaches no class of cases with more confidence of a successful issue than strictures of the nasal duct. If there is much nasal catarrh or ozæna, then marked success cannot be expected. He thinks it is better to begin with a No. 5 or No. 6 probe, as it is less likely to produce a false passage. His method of operating is first to anæsthetize with cocaine, then pass a small probe through the puncta and canaliculus to look for and overcome any stricture at the junction of the canal and the sac. This facilitates the entrance of the probe-pointed canaliculus-knife into the sac. Having slit up the canaliculus, he passes a No. 5 or No. 6 probe, or a smaller one if he fails with this, having first anointed the instrument with vaseline containing ten per cent. of cocaine. Having surely entered the sac, he does not hesitate to use force in passing the stricture, and has never seen serious consequences. He passes the probe every other day and increases by one number each time, skipping a number if the probe is freely passed, and dropping back one if the stricture is too tight. In two-thirds of

all of his cases, including children, he has used a No. 16 probe. Having reached the largest probe he intends to use, he increases the interval. The only objection that he knows to the treatment is that the duct may remain too pervious and air pass freely when the nose is blown, but such inconvenience he thinks is very small. In addition to probing he also prescribes collyria, either bichloride of mercury, 1 to 12,000, or alum, 10 grains to the ounce. He does not attack a fistula or carious bone, because they take care of themselves if the passage is open. Stricturotomy has never appealed to him as a rational treatment, nor has he ever had any reason to destroy the lachrymal sac.

THE SURGICAL AND MECHANICAL TREATMENT OF GRANULATIONS OF THE CONJUNCTIVA.

DR. A. TROUSSEAU (*Archives d' Ophthalmologie*, April, 1893), writing concerning the surgical treatment of granular lids according to Darier and Abadie, asks and answers several questions:

1. Is the treatment dangerous? The author does not consider it dangerous. Out of seventy-five operations he had only one serious accident, a total symblepharon, which was owing entirely to negligence in the dressing. On the other hand, he saw a child that had been operated upon who had lost a large part of the upper eyelid. Still, this serious accident could scarcely be attributed to the method.

2. Is the treatment an inconvenient one? Certainly it is. It is painful, requires rigorous watching of the results of the operation, and is associated with certain complications, as, for example, considerable hardness of the eyelids, conjunctival scars, entropion, etc. These complications are not constant, and are not serious enough to discard surgical treatment. The sequences of the operation last from four to six weeks. A month's stay in the hospital is desirable.

3. Does the treatment radically cure the granulations? This is, of course, the most important point. Trousseau has not found that in the most serious forms this treatment radically cures the granulations, though it is successful in average cases. In the former cases he has had récourse to complementary treatment of caustics and mechanical proceedings.

From varied experiences he concludes that surgical treatment alone cannot produce recovery, that it must be supplemented by other treatment, and that in his hands it has never given the rapid results that Darier has claimed. While it relieves granulations, it does not cure at once; and, indeed, after the first improvement a long stationary period follows. The mucosa should be normal two or three months after the operation. For average cases scraping and brushing are recommended, with recovery after three or four months.

Touching the question as to the definite character of the cures, and whether relapses take place, Trousseau's experience leads him to believe that without supplementary treatment relapses always occur. He has had patients who were perfectly well for two years, eighteen months, and one year; others returned to him in a very disappointing condition, though they had recovered promptly after the operation. He has arrived at the conclusion that curetting—the most dangerous operation for the mucosa—might be omitted. He prefers brassage only for recent and superficial granulations, and scarification followed by rubbing with sublimate for chronic, flat, and interstitial granulations. For average cases two mechanical proceedings are recommended,—rubbing with a pumice-stone dipped in sublimate, and rubbing with cotton wet with the same liquid. Patients prefer these, in his opinion, to sulphate-of-copper cauterizations. They may be alternated with the sulphate-of-copper method. He thinks that the Knapp forceps are very satisfactory, but that the operations must be repeated several times and followed by vigorous rubbing with sublimate. He has compared the Darier method with several mechanical processes and cauterizations, but has not been able to come to any conclusion other than that no one method can be insisted upon. The tact of the physician must select the proper procedure.

MINERS' NYSTAGMUS AND TESTING FOR FIRE-DAMP—A PRACTICAL POINT.

SIMEON SNELL (*British Medical Journal*, May 13, 1893) contributes a short article upon this topic, which is here reproduced in its entirety:

The detection of fire-damp is a vital matter to all concerned in a coal-mine. So much, indeed, is its importance recognized that we have lately had the researches of Professor Clowes resulting in a very delicate hydrogen lamp for detecting small proportions of fire-damp, since it is held by some mining engineers that the proportion of less than one per cent. of gas may be explosive in the presence of coal-dust. The ordinary method adopted in coal-mines—much

less delicate than that just indicated—is by reducing the size of the oil-flame of the safety-lamp until the luminosity almost disappears, and the fire-damp then appears as a pale flame or "cap" above it, this "cap" being due to the presence of gas in the air. The amount of gas present can be estimated by the appearance and dimensions of the "flame cap." This method, Professor Clowes says, does not detect less than two to three per cent., whilst for some purposes it is necessary, he asserts, to recognize as small a quantity as one-fourth of one per cent.

It will therefore be readily seen how desirable it is that, with the ordinary and less delicate method, indications of the presence of gas should be at once recognized.

The class of men who are chiefly, perhaps, responsible for seeing that the pit is free from dangerous quantities of gas are those called "deputies," or "firemen." It is part of their duty to visit the "workings" before the colliers go to their work, and during their working shift, to ascertain that gas in any amount is not present. Throughout their regular day's work, also, they are constantly on the lookout for any indication of fire-damp. Those who are familiar with my writings on nystagmus in miners will be aware that I particularly mention its presence among this class of underground workers. In my book on miners' nystagmus this part of the subject is dwelt with at some length, and the manner of their work is represented by photographs.

For long it has been my opinion that the dancing of the lights and other objects which forms such a prominent symptom of the disorder would, in especially well-marked instances of the affection, be a hinderance to the delicate detection of the "cap" spoken of as showing the presence of gas. It has been a matter that has been a frequent topic of conversation between myself and my friends among mine authorities. The importance of the subject has been recognized. Further than this, my interrogation of "deputies" afflicted with nystagmus showed some time since that there was the interference anticipated in some cases, at all events. One deputy in particular told me that it did undoubtedly hinder the accurate estimation of the presence of a cap, and that this became more evident as the day wore on at his work. It is, however, only just now that a definite and, I believe, thoroughly reliable investigation of a man at his work has been made. It arose in this way: An official in the management of a colliery some little distance away was much interested in my published views on miners' nystagmus, and in the course of conversation one day he stated that he felt sure he knew a deputy who was the subject of nystagmus. He knew it from the man's manner at his work. When he was in the mine he frequently saw this man. Here was an opportunity for putting to a practical test a nystagmic (presumably) deputy's capacity for detecting fire-damp. My friend undertook to do it in the ordinary course on his going into the mine, as opportunity offered, and in a way that would not lead the deputy to think that he was being tested. These points he carried out, and I append the account of his investigation, which he kindly sent to me.

"The deputy and I had been travelling on a low length of faces, and came to a gate in which we suspected the presence of gas; in fact, could detect it by its smell. He raised up his lamp towards the roof, and a 'cap' began to show upon the top of the flame. He, however, continued to raise his lamp until the flame lengthened out, and then said, 'See, there it is.' I then lifted up my lamp and asked him to speak as soon as the flame began to show the cap. The result was the same as with his own lamp, for he could not see it until the flame began to lengthen out to a considerable extent, and never noticed the first signs of the presence of gas. I may say that about a minute before he had complained of dizziness, which he said came upon him when he knocked about."

Since this investigation my friend has very kindly afforded me an opportunity of examining the deputy. I find him a middle-aged man, who has been a deputy in different collieries for many years. He has well-marked nystagmus; the oscillations are readily induced on looking upward; especially is this the case when the gaze is turned up more or less obliquely to the right. On questioning him, he at once says that on looking towards the roof to examine its condition or for gas, he inclines the head chiefly on the left shoulder. After the oscillations are once set going by looking upward, they will be still noticed, but less so, by looking horizontally, but stop immediately the gaze is turned downward. He is the subject of characteristic and well-marked nystagmus. His complaint of lights and other objects dancing is that they move rather in an ellipse than in a circle.

A "deputy" also, who is an intelligent man, gives an interesting account of the first occasion on which he observed the lights in the mine to dance. He was, with a companion, going up an incline, at the top of which, at the pit bottom, were some lights. He saw, as

he thought, these waving, and taking this to be a signal that a "corve" or "tub" was running away down the incline, he seized and dragged his mate into the man-hole to get out of the way of it. On his companion looking, he knew at once that all was clear, and told him that there were no lights waving. His symptoms date from two years back, but he states that he is somewhat better the last year, having now higher and better roads to traverse.

As I write this article another "deputy" has been sent to me. He ceased to work in the pit a year ago, owing to nystagmus, but oscillations can still be occasioned by keeping his eyes in the position he would have had them at his work. He says that, "to speak the truth, nystagmus does not interfere with testing for gas." He was conscious of it himself, and tells me that he watched other deputies, who he felt sure were suffering worse than he was, and he was convinced of their inability readily to recognize the "cap." In a mine with which a deputy is familiar, he knows better where to expect gas; but if one suffering from nystagmus was employed in a new pit that was "heading out," he would, of course, be at much greater disadvantage in detecting small proportions of gas. This man's father was killed in an explosion many years ago. He was a deputy, but whether he suffered from nystagmus or not is not known.

Enough has perhaps been said to indicate that there is a very practical interest attaching to miners' nystagmus, and different from that which has hitherto been associated with it. It would be well, it seems to me, that in any inquiry into mine-explosions, which, unfortunately, are still heard of too frequently, the bearing of nystagmus as a possible element should be borne in mind. Further inquiry will show what practical bearing the subject here discussed has; but mine authorities with whom from time to time I have had the opportunity of discussing it have been of opinion that it is one of importance. Other points connected with this question I must for the present defer.

THE INDICATIONS FOR SUBCONJUNCTIVAL INJECTIONS OF CORROSIVE SUBLIMATE.

GRANDCLEMENT (*Lyon Médical*, April, 1893) concludes that until more ample information is at hand, subconjunctival injections are (1) slightly effectual in affections characterized by infiltration of the cornea; (2) much more effectual in diseases of the uveal tract (iris and choroid); (3) not at all effectual in affections of the internal layers of the retina. He refers to the experiments of Pflüger with fluorescine, to discover the method by means of which subconjunctival injections penetrate into the interior of the eye, by which it was shown that the liquid injected reaches first the cornea, then the anterior and posterior chambers and the suprachoroidal space, and, finally, to the peripheral layers of the crystalline and of the vitreous humor, but not to the retina. Therefore it is not surprising if microbic or organic diseases which have lodged in the parts to which the sublimate has access when it is injected underneath the conjunctiva, disappear before this agent when their origin is incompatible with its bactericidal or, at least, its antiseptic properties.

Grandclement thinks that it is easily understood why sublimate is helpless against affections of the retina, with which it cannot be put in direct contact for want of lymphatic spaces to carry it to this membrane. Since Schwalbe's investigations, it is shown that the retina is entirely outside of the lymphatic currents of the eye, and maintains only direct and intimate relations with the nervous centres, of which it is one of the earliest emanations. He desires to say, in concluding his article, that it is very possible that these subconjunctival sublimate injections not only act in sterilizing the corneal and uveal territories and freeing them from the microbes or toxines which may visit them, but also produce a veritable local revulsion, and consequently a powerful vaso-constriction on the vascular intraocular stases. He points out that revulsives applied in the neighborhood of the orbit—for example, a fly-blister or a seton—act happily, and that the periorbital injections of antipyrin which he has recommended have been very successful in serious deep-seated and obstinate ocular affections. Hence it seems to him probable that injections of sublimate under the bulbar conjunctiva produce a similar revulsive effect, but still more rapid and intense, because of their greater proximity to, and their direct action upon, the intraocular vascular stases.

THE EMPLOYMENT OF THE SKIN OF THE EEL (LOTA VULGARIS) IN BLEPHAROPLASTIC SURGERY.

KATZAUROFF (*Wiestnik Oftalmologii*, January and February, 1893; abstracted in *Annales d'Oculistique*, April, 1893) transplanted the skin of a lote to cover an area caused by destruction of both left eyelids and the corresponding temporal region, and at the end of

two days the whole surface of the grafts was pink, smooth, and shining. Fifteen days after the operation the regions occupied by the sections transplanted on the temple decreased notably, and a careful examination showed that it was not due to an atrophy of the grafts, but that they were gradually being covered by a layer of epidermis. This layer passed insensibly from the peripheric portions to the grafts themselves by forming a border around them. Little by little the same process was observed on the eyelids. Thus the lote skin grafted on the wound served as a bridge upon which the horny layer of the surrounding skin was developed, and at the end of a month the grafts were completely covered with it. The author saw the patient three months after the operation, and there was no change in the condition of the eyelids.

RESTORATION OF THE EYELID BY MEANS OF THE SKIN OF A FROG.

GILLET DE GRANDMONT presented to the Ophthalmological Society of Paris (*Annales d' Oculistique*, April, 1893) a young man, aged eighteen, who was afflicted with cicatricial ectropion of the upper eyelid, rendering closure of the eyes impossible. There was a separation of eight millimetres between the palpebral edges. He proceeded first to suture the eyelids, after relieving the ectropion, obtaining a large surface, which he covered by means of the skin taken from the stomach of a frog, rendered aseptic by allowing the animal to float in a solution of boracic acid. He manufactured a tessellated graft by means of small sections of the skin placed one in contact with the other. The result was good, although several of the sections gave way and had to be replaced. At the end of six months the eyelids were practically normal.

TRAUMATIC DENDRITIC KERATITIS.

HALTENHOFF (*Annales d' Oculistique*, April, 1893) describes a case of dendritic keratitis in a man, aged forty-four years, the result of a blow on the eye from a cow's tail. There was ciliary injection, and on the cornea a clear gray spot in the shape of a triangle, beginning near the upper edge of the cornea and ending in a point on a level with the lower edge of the pupil. Examination with a magnifying glass showed the dendritic arrangement of the ulceration. The treatment consisted in painting the conjunctiva with nitrate of silver, one per cent., superficial scraping of the opacity, and the application of a solution of sublimate 1 to 2000. The same solution was prescribed as a collyrium, and a salve of atropine was introduced. The lids were closed by means of a bandage. The cure was rapid, and the vision three months afterwards was $\frac{5}{10}$.

PAINFUL MICTURITION IN WOMEN.

In an admirable lecture upon this subject, HERMAN (*Provincial Medical Journal*, vol. xii., No. 138) states that about one-half the patients who consult a specialist for diseases of women complain of pain in passing water; but it is only the diseases which cause severe pain which require special treatment, so far as the urethra and bladder are concerned. All these cases of severe pain depend upon local diseases, which can only be discovered by direct examination. There are three places in which disease may exist occasioning this suffering,—namely, the *meatus urinarius*, the urethra, and the bladder. Pain in the *meatus urinarius* may be caused by *urethral caruncle*, by chronic congestion or suppurating cyst of the urethra, by abscess of the urethro-vaginal septum, or by a tender, congested condition of the urethral mucous membrane. Chronic congestion of the urethra is chiefly seen in pregnant women; the urethra is swollen and tender and feels like a thick cord. Not only the act of micturition, but sexual intercourse may occasion almost unbearable suffering.

The treatment for this condition is complete rest, cold sponging of the part, cold hip-baths, the use of vaginal astringent injections, one or two leeches applied by a glass leech-tube to the swollen and tender urethra, and gentle laxatives.

Chronic abscess of the urethra-vaginal septum is rare, and is characterized by a tense, hard, convex, bullous, very tender swelling between the urethra and vagina.

The treatment is evacuation. If there is a spot on the vaginal aspect of the swelling which is thin, and fluctuation is felt, the proper course would be to cut into this thin part. If there is no such spot the urethra should be dilated under an anæsthetic until the canal will admit the finger, and the purulent collection can be evacuated through the urethra.

Suppurating cysts of the urethra form a pouch communicating with this mucous canal by a narrow, somewhat valvular, opening; urine gets into the pouch, decomposes, and inflames the sac. On examination, a round, tender swelling is found in the urethro-vaginal

septum, varying in size from that of a pea to that of a hen's egg. By pressure there will be voided either urine or urine and pus, sebaceous matter, or a calcareous deposit, depending upon the nature of the cyst. These cysts do not run the course of an abscess, which gradually close up once an opening has been made for the escape of pus, but they continue indefinitely in the same state, alternately filling with pus and urine, and being partially emptied by pressure.

The treatment is excision of the whole or greater part of the cyst-wall. This is best accomplished by first laying open the cyst freely from the vagina. What is next to be done depends upon the skill of the operator. The cyst-wall should be dissected out and the raw surfaces brought in contact by means of either catgut or shotted sutures. If a portion of the cyst near the opening is left and the rest is closed, the object of the operation will nevertheless probably be attained, for if the pouch is obliterated there will be no place in which urine can be retained and decomposed, and therefore no inflammation. If the operator mistrusts his manipulative skill, it may be enough simply to open the cyst freely from the vagina, and then, by keeping the vaginal opening from closing by packing with lint or gauze, retention of fluid in the cyst will be prevented, the urethral opening may close, and then the cyst will be left with an opening only into the vagina. If no more urine gets into the cyst-cavity, inflammation will subside and no further symptoms will be exhibited.

If there be much inflammation of the cyst, of the urethra, or of the bladder, it may be well to make no attempt at closing the opening until such inflammation has been subdued by appropriate treatment. If the cyst is suppurative, or not open, or the urethral opening of an inflamed diverticulum has become closed, the condition cannot be distinguished from an abscess. When the pus-cavity has been opened, its cystic character will be inferred from its definite smooth fibrous wall. An abscess has not a thick fibrous wall. The inside of a diverticulum may be trabeculated, so that the origin of the pus-cavity cannot always be surely made out from the feel of the interior. If the cavity be an abscess, it will quickly fill up; if it does not quickly become obliterated, it should be treated as a cyst. In some cases the patient will complain of severe burning, cutting pain at each act of micturition, but the meatus will be found to be healthy, nor on palpation through the vagina can any area of inflammation be felt. On urethroscopic examination of the mucous membrane it will be found a vivid red or deep purple, appearing in patches or involving the whole mucous surface. Passage of the catheter is extremely painful.

The treatment is to apply some alterative to the diseased mucous membrane; the best, in the author's opinion, is iodoform. The application is most conveniently made by putting into the urethra a bougie made of iodoform and cacao butter. A little wool put between the labia will prevent the bougie from slipping out. In recent cases the use of three or four bougies will cure the patient. In cases of very long standing more prolonged treatment will be required. Nitrate of silver is also serviceable in this condition. In some cases application of nitric acid to the tender part is followed by relief. Dilatation of the urethra is also to be recommended. In some cases both the meatus and urethra are healthy, but on passing a bougie great pain is experienced as it enters the bladder. In these cases a urethroscopic examination will show either hyperæmia or fissure of the vesical neck, the symptoms of extreme pain on micturition persisting afterwards; also great frequency, and difficulty in emptying the bladder. Sometimes a little blood escapes with the urine. The urine is clear, and there is tenderness about the vesical neck. Direct examination shows the fissure as a small grayish ulceration, with red, inflamed edges at the vesical neck.

The treatment consists in dilatation of the urethra under anæsthesia; this is best accomplished by means of Hegar's dilatators until the urethra admits the finger. Temporary benefit always follows this procedure, and sometimes permanent cure. The objections to this treatment are that there is danger of septic infection of the bladder and of permanent loss of control over the sphincter. Inconvenience rarely results unless dilatation is carried beyond the point necessary to admit the finger. In case dilatation is unsuccessful in relieving symptoms, vaginal cystotomy is indicated. To perform this operation a director should be introduced into the urethra and held exactly in the middle line. Open the bladder from the vagina by cutting upon the director. If the incision is exactly median, no important part can be wounded. To prevent this opening from closing, Greenhalgh's India-rubber stem may be employed, or the vesical mucous membrane may be sewed to the vagina on each side by a catgut stitch. All pain ceases at once, and if the artificial fistula is kept open long enough, the ulcer heals, and then the fistula can be closed and the patient remains well.

To minimize the discomfort of the artificial

incontinence resulting from this operation, the patient should be kept upon a fracture-bed. The rest in bed is of itself beneficial. If nothing is done to prevent the healing of such an incision of the bladder, it soon either heals or contracts to a canal only large enough to admit a probe. As to how long this fistula should be kept open no rule can be given. If as the fistula heals symptoms return, the artificial opening should be again enlarged.

Baker's method of treating these cases is to keep the patients in bed for only a few days, then to fit them with a urinal, and allow them to get up and enjoy fresh air and exercise. The fistula is kept open for months, and is not closed until the interior of the bladder has ceased to be tender and, in case of cystitis, until all trace of pus or blood has disappeared from the urine. This, however, sacrifices the advantages of rest, and it has the discomfort of constant soiling of the clothing.

NON-PERFORATING PERITONEAL AND INTESTINAL LESIONS AND THEIR TREATMENT.

THOMSON (*Zeitschrift für Geburtshilfe und Gynaekologie*, Band xxvi.) says it frequently happens that in operations for fibroid tumors, ovarian tumors, tube-sacs, etc., the tumors are closely fixed to the bowel by adhesions. Two cases are reported by Cleveland in which the peritoneum and muscular layer were torn off for a number of inches. The wound was closed with a continuous suture. One died and the other was saved by a secondary anastomosis operation. Coe reports a case where three or four inches of peritoneum were torn off from the colon, followed by paralysis of the gut at that point. Often it is only necessary to use an intraperitoneal tampon placed against the wound surface, thus hindering peristalsis, and allowing time for adhesion to take place.

When the bowel itself is diseased, Boldt recommends enterorrhaphy with anastamosis. Small peritoneal defects of one or two inches may be let alone.

The author has made experiments on five dogs. A simple laparotomy was done, and the peritoneum stripped from the bowel for several inches. In others the muscular coat was also removed. In all a small perforation was made and closed again with sutures, and the bowel dropped back into the abdominal cavity. The dogs were killed at different intervals and the condition examined. In some adhesion had taken place between the coils of intestines, while in others there was no adhesion, and the original wound could scarcely be found.

In conclusion, the author states that defects of about one centimetre should be closed by sutures, and, where practicable, in the long direction of the bowel.

In defects of from five to ten centimetres the bowel should be turned around ninety degrees in the long axis and fixed to its mesentery.

The Treatment of Wounded Ureters.—When a considerable piece of the ureter is accidentally removed, the proximal end must either be turned into the rectum or bowel, and in some cases the kidney even must be extirpated. In a case reported by Pozzi the proximal end was fastened in the loin and the distal in the abdominal wound. Two fistulæ resulted, but were subsequently closed by nephrectomy.

Gusserow closes longitudinal wounds with the ordinary intestinal suture. In a case of end-to-end suture the patient died on the sixth day of abscess and septic peritonitis. In such cases Gusserow recommends opening the abscess through Douglas's pouch, with the formation of an external fistula.

Pozzi also recommends suturing the ureter over a soft catheter, one end of which is to be pushed into the bladder and removed through the latter when union has taken place.

Pawlik adopted the above procedure in one case; death fourteen days later.

Occasionally the partial retention of urine in the kidney, which must necessarily follow the use of sutures, causes complete atrophy of the kidney on that side. No attempt should be made to suture the proximal to the bladder with the hope of re-establishing the urinary channel, it being much better to suture to the nearest loop of intestine.

EXPERIMENTAL CONTRIBUTIONS TO THE QUESTION OF ANTISEPTICS IN THE TREATMENT OF SURGICAL DISEASES OF THE URINARY PASSAGES.

KROGIUS and CHYDENIUS (*Centralblatt für Chirurgie*, No. 17, 1893) have made over five hundred experiments as regards the antiseptic value of corrosive sublimate, biniodide of mercury, nitrate of silver, boracic acid, and permanganate of potassium. Into pure cultures of the bacterium colli commune, proteus vulgaris, staphylococcus pyogenes aureus, and streptococcus pyogenes silk threads were placed and then allowed to remain in the different antiseptic solutions for varying intervals.

The threads were then put into flasks of sterilized urine and cultures made.

From these experiments the authors found that the staphylococcus almost completely resisted the action of the mercury solutions.

The biniodide is much weaker as an antiseptic than the bichloride.

The resistance against the nitrate-of-silver solution was most marked in the colli commune and the least by the streptococcus.

Boracic acid and potassium permanganate exert very little influence on these organisms.

Disinfection of instruments is best carried out by means of a nitrate-of-silver bath, 1 to 500, for one hour, fatty substances being removed by immersion in alcohol or ether.

THE TREATMENT OF DIARRHŒA IN HOT COUNTRIES.

DANTEC and BONAMY (*Internationale Klinische Rundschau*, 1893) are in the habit of using chloroform-water for these cases.

℞ Aquæ chloroformii, sat.,
Aquæ dest., of each, 100 grammes.
To be taken at intervals during the day.

When the diarrhœa is associated with dysentery, chloroform-water is also used, but at the same time the colon is irrigated with antiseptic solutions.

Bonamy has used injections of corrosive sublimate in dysentery. No poisonous symptoms have as yet been noted. The preparation of the clyster is as follows:

℞ Corrosive sublimate, grs. i;
Water, ℥xvi.
For two injections, morning and evening.

ENCHONDROMA OF THE SCAPULA.

FRANK (*Internationale Klinische Rundschau*, No. 22, 1893) reports the case of a large enchondroma of the scapula resulting from a contusion, in a man forty-five years of age. The tumor was removed by Von Dittel, and weighed about nine pounds. About two years later a small growth was noticed in the clavicle, and in a few months a tumor the size of a child's head was removed.

The following year the tumor began growing in the infraclavicular fossa, and soon reached the size of an orange. This was likewise extirpated and the patient recovered. Another operation was done for a similar growth in the same region a year later.

Still one year later the tumor returned, and a portion of the clavicle and spine of the scapula were removed. One year later the man again returned with a tumor involving the remaining parts of the scapula and clavicle. A shoulder-joint amputation was performed and the entire clavicle and scapula removed. The patient recovered. As soon as the patient was out of bed there immediately developed a marked right convex scoliosis.

TEMPORARY RESECTION OF THE SYMPHYSIS AS AN AID TO THE EXTIRPATION OF TUMORS OF THE BLADDER.

BRAMANN (*Centralblatt für Chirurgie*, No. 17, 1893) gives the following technique for the operation: A small median incision is made over the symphysis and another incision at right angles to it, also over the symphysis, extending from cord to cord.

After division of the periosteum a small piece of bone is chiselled out of the symphysis, including that part of the bone to which the recti muscles are attached.

After division of the attachments of the muscles they retract to a point about midway between the symphysis and umbilicus.

After the operation the ends of the bones are brought together and held in apposition by periosteal or bone sutures.

A half-sitting position with flexed legs should be maintained for eight or ten days.

A CASE OF COMPLETE RUPTURE OF THE URETHRA.

FRANK (*Internationale Klinische Rundschau*, No. 22, 1893) reports the case of a man, aged thirty-three, falling from a height against a gas-lamp, a projecting iron entering his perineum. There was bleeding from the urethra and almost complete retention, and a large hæmatoma was found in the perineum. A metal instrument could be passed without great difficulty into the bladder.

A perineal incision was made, the clot turned out, and the divided ends of the urethra found just behind the bulb. The ends of the urethra were sutured together with two rows of fine silk sutures.

The first row of sutures held the divided urethra together, while the second row held the peri-urethral tissue in close apposition. The wound was completely healed on the seventeenth day, and a No. 19 steel sound could be passed without difficulty.

According to Kauffmann, seventy-three per cent. of the cases of rupture of the urethra have retention of urine.

EARLY EXTIRPATION OF SARCOMA OF THE KIDNEY.

ISRAEL (*Deutsche Medicinische Wochenschrift*, No. 22, 1893) says it is possible to diagnose a tumor of the kidney, the size of a cherry, by palpation. He reports the case of a girl, aged six years, who had suffered from hæmaturia for several months. Examination of the ureters through the bladder showed blood flowing from the left ureter. By careful palpation the author was able to make out a small lump about the hilus, which seemed to fill up the pelvis of the kidney.

At the operation a small sarcoma was found occupying the position of one of the pyramids. The kidney was removed and the case recovered.

The mortality of kidney extirpation is about sixteen per cent.

THE SACRAL METHOD OF EXTIRPATING THE UTERUS.

STEINTHAL (*Deutsche Medicinische Wochenschrift*, No. 21, 1893) says many cases of malignant disease of the uterus have apparently been cured. Fritsch reports that thirty-six per cent. of his cases remained free after five years; the Berlin clinic, twenty-five per cent.; Leopold's clinic, sixty per cent.

The sacral method of extirpation is to be preferred when the tumor is so large that in doing the vaginal operation the dividing-line between diseased and healthy tissue cannot be made out.

A virgin vagina and a soft uterus are contra-indications to the vaginal method.

A very careful dissection should always be made, and the use of *ligatures en masse* should be strictly avoided, as they are apt to hide small foci of disease.

In operating the patient should be placed on her abdomen and the pelvis elevated; the side position may also be used. The elevation of the pelvis has some disadvantages,—sudden death from emboli of the pulmonary arteries, and thrombosis of the thigh and pelvic veins.

The mortality of the sacral operation is no greater than the vaginal.

THE MODERN TECHNIQUE OF LAPAROTOMIES.

DÖDERLEIN (*Deutsche Medicinische Wochenschrift*, No. 21, 1893) says all laparotomies, where possible, should be done in a room especially adapted for the purpose. The walls should be coated with an enamel paint and the floor with linoleum. The room should be filled with sulphur-fumes and sprayed with water, so that free sulphur acid is formed.

The instruments, catgut, silk, sponges, etc., are to be subjected to a temperature of 120° to 140° centigrade (dry heat). The instruments may be boiled in the soda solution and afterwards dried with sterilized gauze.

Catgut may be boiled in sublimate alcohol, and repeatedly washed in absolute alcohol until free from sublimate.

The gauze is best sterilized in steam.

The skin of the abdomen should be thoroughly washed with soap and hot water, with free use of the brush, followed with alcohol, ether, and sublimate solution. Just before the operation the skin should be thoroughly rubbed with a sterilized towel.

In the treatment of the stump after a myomectomy, Zweifel recommends continuous intraperitoneal ligature. All bleeding should be stopped, and the edges of the peritoneum should be sutured as soon as possible, thus closing off the abdominal cavity.

Drainage-tubes do not drain the entire abdominal cavity, but only that part in which the tube lies.

OSTEOPLASTIC CLOSURE OF DEFECTS OF THE SKULL.

TIETZE (*Archiv für Klinische Chirurgie*, Band xlv.) reports two cases of osteoplastic closure of defects in the skull.

The first, a boy aged ten, had a complicated depressed fracture of the frontal bone. The boy was trephined and the loose fragments removed, leaving an opening five centimetres long and three wide. The wound was closed, and patient wore a plate on that side for three years. From the position of the opening and the possibility of an accident, it was decided to try and close it. A flap of bone, including all of the outer table and part of the middle, was taken from the frontal bone, and the flap sutured over the defect with silver wire. There was complete union.

The second case was one of resection of the frontal bone for carcinoma of the dura. The patient, a woman aged fifty-one, five years previously noticed a small ulcer over the right eye, which, during that time, gradually increased in size. The diseased bone was removed with a chisel, leaving an opening about the size of a silver dollar. The dura was removed, and a flap of bone was twisted around from above and allowed to rest directly on the pia. The flap was secured with silver sutures and an iodoform gauze drain inserted at the lower angle of the wound.

The transplanted flap healed immediately, and the bare bone from which the flap was removed was allowed to granulate and was cicatrized with Thiersch's grafts. No changes were noticed either in the peripheral or central nervous system.

EXPERIMENTAL CONTRIBUTIONS TO THE SURGERY OF THE ABDOMEN.

THOMSON (*Zeitschrift für Geburtshilfe und Gynaekologie*, Band 26) reports as follows on sutures of the intestines: Chaput employs the Gussenbauer knot, which consists in suturing the edges of the mucous membrane together, and strengthening by a double row of sutures in the peritoneal layer.

Wells prefers either the Lembert or Bishop suture, the latter being a continuous ligature in parts.

In the author's experiments the following technique was carried out: After resection of the small intestine, a fine needle with a feather eye, armed with a long silk thread, is carried through the bowel from the mucous side one millimetre from the line of incision. It is then pushed through the other end of the bowel at a corresponding point from the serous to the mucous side. The suture is left long and the needle again introduced in the same manner from two to three millimetres from the original puncture, and so on around the entire circumference. The sutures are then knotted, the latter all being in the lumen of the bowel. The serous surfaces are well approximated. The knots should not be drawn too tight for fear of causing necrosis. The author thinks that the bone plates of Senn have several disadvantages:

1. Danger of invagination.

2. The plates pressing on the lumen of the bowel, causing gangrene.

3. The final fate of the plates is not always certain.

For the simple end-to-end method the Lembert-Czerny should not be used, as it is almost invariably followed by stenosis.

For suturing the author always employs fine silk.

THE QUESTION OF IMMUNITY AND THE VALUE OF BLOOD-SERUM IN PREVENTING CHOLERA INFECTION.

PAWLOWSKY and BUCHSTAB (*Deutsche Medicinische Wochenschrift*, No. 22, 1893) have made many experiments as to the value of blood-serum in preventing cholera. The experiments were made after Pasteur's method.

A quantity of the pure culture was injected into the blood of an animal and gave a negative result.

By transmission of the peptotoxine through a series of rabbits and guinea-pigs a culture of great virulence was obtained.

A dose of from 3 to 5 cubic centimetres killed the animals in from twelve to twenty hours.

A very weak culture is injected into the blood or the peritoneal cavity and gradually increased up to the very powerful cultures. In the course of a month many animals were rendered immune.

Five cubic centimetres of the virulent culture were injected into the peritoneal cavity, and in from one to five hours blood-serum from an immune animal was injected under the skin.

Seventy-five per cent. of the animals lived. All the control animals died.

The authors claim to have isolated a substance from the blood-serum of immune animals which possesses as much power to render animals immune as the blood-serum. They experimented upon themselves with the serum from immune animals, but no changes were noted.

OPERATIONS UPON THE UTERINE APPENDAGES WITH A VIEW TO PRESERVING THE FUNCTIONS OF MENSTRUATION AND OVULATION.

POLK (*American Journal of Obstetrics*, June, 1803), in reading his paper with the above title before the American Gynæcological Society, at its session held in Philadelphia, May 16, 17, and 18, 1893, reaches the following conclusions:

1. In cases of chronic disease of the appendages the incisions should be in the nature of "exploratory incisions."

2. The question of removal should be in the main left for determination after the organs have been exposed.

3. That the condition of the ovary should be the chief factor in determining the question of procedure.

4. That, if need be, this may be determined by exploratory incision of the ovary or puncture.

5. That if the ovary contains pus, it and the associated tube should be removed, it being the rule that whenever an ovary is removed the tube must accompany it.

6. That if the tube contains pus, the ovary being free from pus or disseminated cystic degeneration, the operator is at liberty to recom-

mend either the removal of both organs or else the partial amputation of the tube, leaving the ovary; and that the same rule should apply in cases of hydrosalpinx and hæmatosalpinx.

7. That cysts of the ovary do not indicate removal, provided they are not general throughout the organ and can be enucleated,—hæmatoma of the ovary a possible exception.

8. Tubes with open infundibula, even though adherent and affected with parenchymatous inflammation and endosalpingitis, do not demand removal, excepting when one opens into a pus-cavity.

9. A tube whose outer end is closed may be opened, cleansed, and its inner and outer coats coaptated, and then be returned to the abdominal cavity, provided it does not contain pus and possibly old blood.

10. Adhesions do not demand the removal of the tubes and ovaries, unless they be so dense that in breaking them the appendages are seriously injured. This presupposes that the appendages in themselves are not sufficiently diseased to demand removal.

SURGICAL TREATMENT OF GALL-STONES.

DUNCAN (*Edinburgh Medical Journal*, June, 1893), after detailing several cases coming under his observation, reaches the following conclusions:

1. That when the stones lie in the gall-bladder or lightly impacted in the cystic duct, cholecystotomy is a safe and easy operation.

2. That if the stone be impacted in the common duct, the gall-bladder is apt to be small, and such structures as the stomach and colon are prone to be adherent in awkward positions.

3. That in such cases it is safe to incise the duct and drain from the wound.

4. That, considering the perfect health enjoyed by patients with biliary fistula, there are few cases in which it would be justifiable to form a new route for the bile into the bowel.

ABDOMINO-PELVIC FISTULÆ AFTER CŒLIOTOMY AND LAPAROTOMY: ITS PREVENTION AND TREATMENT.

MUNDE (*American Journal of Obstetrics*, June, 1893) states that following the removal of intraperitoneal growths abdominal fistulæ in a large number of cases are formed. They are usually single, and rarely separate into two or more deep passages among the diffuse adhesions in Douglas's pouch. They are generally directly in the median line, and, if deep enough, the probe or sound can be felt per vaginam directly behind or beside the cervix.

Other abdominal sinuses are liable to remain after the evacuation of abscesses originating in the abdominal and pelvic cavity and pointing through the abdominal wall to the side of the median line, usually close to Poupart's ligament, or into the iliac fossa. Such abscesses may be originally intraperitoneal, either localized purulent peritonitis, or pyosalpinx, or pus ovary, and are separated from the intact peritoneal cavity by more or less dense adhesions. Or they may be intraligamentous, cellular, due to inflammation and suppuration—usually post partum—of the connective tissue between the broad ligaments and the vagina, rectum, and bladder. Such true pelvic abscesses may attain great size, burrowing in all directions. Usually the pus gropes its way along the pelvic wall, and finally reaches the abdominal skin in the upper portion of the inguinal canal close to the anterior spinous process of the ilium. If the abscess was originally intraperitoneal, it is more likely to point farther inward towards the median line, so that when incised the examining finger finds the peritoneum still attached to the pelvic wall and iliac fossa, the abscess cavity being shut off from the rest of the peritoneal cavity by a wall of firmly-adherent intestines. In the latter case the pus usually does not approach the abdominal wall quite so closely, and the surgeon is obliged to make a deeper incision to reach it than if the pus came up from the pelvic cellular tissue. If the abscess happens to be on the right, it is often impossible to decide whether it is due to an appendicitis or a pyosalpinx. The prevention of these fistulæ would apparently depend upon strict observance of antiseptic precautions, removal of all diseased and infected tissue, employment of only absorbable animal sutures, and closing the wound completely. Observance of these general principles would certainly do much to lessen the number of these fistulæ. It will not, however, prevent their recurrence.

The treatment of abdomino-pelvic sinuses is in the first place removal of the cause. Thus, silk is sometimes found, by gentle probing, occupying the sinus, and may be removed by long forceps. Unhealthy granulations should be curetted away, the canal being irrigated by a 1 to 5000 bichloride solution and packed lightly with iodoform gauze or plain sterilized gauze, the irrigation and packing being repeated daily. If necessary, balsam of Peru or tincture of calendula, 1 to 4 of water, may be poured into

the sinus every day before repacking it, in order to stimulate healthy granulation. The stick of silver nitrate or silver probe, heated to red heat and passed to the bottom of the sinus, will sometimes accomplish a cure. Eventually, when the sinus obstinately refuses to close, there are two courses open to the surgeon to attain this object, neither of which is sure or entirely safe. The first is, to drain through into the vagina, if the sinus is so deep as to allow the tip of the sound to be felt through the vaginal wall. An incision with knife or scissors is made on the tip of the sound, which latter is pushed through into the vagina, a white-rubber, perforated drainage-tube is tied over the knob of the sound, and both are drawn up and out of the abdominal wound. The drainage-tube should be sufficiently long to protrude from the vagina. The abdominal end of the tube is secured from slipping into the sinus by a safety-pin. Daily irrigation through the tube with tepid salt water or Thiersch's solution should be carried out until all secretion ceases; then the tube should be drawn down an inch, so as to leave that much of the upper portion of the sinus empty, with a view to its closing. The tube must be retained in place by packing the vagina with iodoform gauze, which need not be changed oftener than once or twice a week. To prevent the tube from slipping too far down or out a stout piece of catgut should be attached to its upper end, which is kept from slipping into the wound by a safety-pin. In a week or ten days the catgut will be absorbed, and by this time the granulations will have closed the upper portion of the sinus. Every week, or oftener, if thought best, the tube should be drawn down an inch or more, so that in this way provision is maintained for drainage without interference with the gradual closure of the upper portion of the sinus. Obviously some weeks at least must elapse before a cure is obtained by this method.

Sometimes while drawing the drainage-tube from the vagina into the fistula the bladder wall is ruptured. This is because it is adherent to the wall of the fistula, and becomes from inflammatory infiltration extremely friable. The accident is not of serious import, since a retained catheter in the bladder and frequent tepid irrigations of this viscus result in closure of this rent in a few days.

When the sinus is ramified in several directions between the pelvic viscera, it is hardly worth while to try to close the one pointing towards the vagina and leave the others untreated. In such cases, if nature does not accomplish a cure they are beyond treatment.

The second course open to the surgeon is to enlarge the wound, as much as is safe, down to the bottom of the sinus, and treat it like any other open wound, by irrigation and wet gauze packing, until it heals by granulation. This procedure is, however, not safe, since there is danger not only of injuring immediate viscera, which practically form the walls of the sinus, but also of infecting the general peritoneal cavity. If the enlargement of the sinus fails, there is still left a true cœliotomy and an attempt to solve the source of the persistent discharge from the sinus by intraperitoneal exploration. It is possible that a diseased tube or ovary or deep-seated pus-pocket among adhesions at the bottom of Douglas's pouch, after the removal of appendages, may be the source of the discharge. This would apply, of course, chiefly to cases where the operation originally was intraperitoneal, for the removal of diseased appendages.

Munde does not believe in this method except when it is resorted to for the sole purpose of locating with the fingers in the peritoneal cavity and bimanually the exact site of the pocket from which the sinus starts, after which the peritoneal wound is closed and the operation performed extraperitoneally. In this way some deep-seated extraperitoneal abscesses can be located, as also the presence and exact site of the inflammatory exudate or suppuration in appendicitis.

HYPODERMIC METHOD IN THE TREATMENT OF SYPHILIS.

WHITE (*University Medical Magazine*, June, 1891), after an exhaustive discussion of the title of this abstract, reaches the following conclusions:

1. The hypodermic treatment of syphilis has not as yet shown results which warrant its adoption as a routine method to the exclusion of or in preference to other methods, but, on the contrary, has some apparently inseparable disadvantages, and even dangers, which render it improbable that it ever will be so adopted.

2. The circumstances under which hypodermic medication should be employed may be summarized as follows: (*a*) Those cases in which other methods of treatment have been tried and failed; (*b*) those cases in which, owing to idiosyncrasy or intercurrent disease, the skin and the digestive tract cannot be used for the introduction of mercury; (*c*) those cases in which, owing to grave and advancing lesions, rapid mercurialization is absolutely necessary; (*d*) those cases in which obstinate localized lesions can be most directly reached by this

plan; (*e*) possibly those cases referred to by Julien, in which early differentiation between syphilis and malignant disease, or tubercular ulceration, is extremely important, should be included in this list. He advises employing the method in all doubtful cases which admit of it, particularly in those conditions of the tongue which often leave the surgeon for a considerable time in doubt as to their exact nature; anything which promises to shorten this period of doubt, by rendering the therapeutic test more rapid and more certain, would be of great advantage. He should, however, in such instances, feel obliged to use potassium iodide by the mouth at the same time; (*f*) a theoretical possibility of the employment of mercury hypodermically has suggested itself to the author, but he has not yet actually employed it. It may be that its use by this method will aid in shortening the period of doubt which often intervenes between the appearance of the primary sore and the development of general adenopathy, or of the exanthemata. If, in the presence of a sore of uncertain character, the employment of mercury hypodermically resulted in rapid cicatrization, no local treatment being employed other than cleanliness, it might occasionally throw light upon the case without being open to all the objections which attend the systematic and slower administration of mercury by the mouth. It is possible that the idea is worth a trial in exceptional cases, but White does not think it should be adopted as a routine practice.

3. As to the choice between the two great classes of mercurials, the soluble salts are to be preferred to the insoluble in the large majority of cases as more exact in the matter of dosage and much less dangerous and less likely to be followed by local disturbances. They are always to be used when there is need for rapid mercurialization.

The insoluble salts should probably be reserved for those cases in which frequent visits to the surgeon are impossible and in which no contraindications exist. In cases of defective kidneys, diabetes, profound anæmia, marked atheroma, great debility, etc., such methods are dangerous, and the case, even if urgent, will probably do better under some other form of treatment.

4. Finally, as to the special preparation to be employed. Among the soluble salts the bichloride is probably to be preferred. The results from its use are not strikingly different from those obtained from the other compounds of this class, but its stability and great solubility and its germicidal qualities seem to warrant its selection. The disadvantage is the pain which it causes, but the evidence in this direction shows that in the hands of impartial investigators not responsible for the introduction of the particular substance employed each of the salts on the list produces a considerable amount of pain and a not inconsiderable number of accidents or complications. Probably the bichloride is freer from objectionable features, in respect especially to the production of suppuration, than any of the salts of mercury.

Among the insoluble salts, calomel and the yellow oxide are to be preferred. It would appear that the latter is a little less active, but at the same time much less irritating. Gray oil is the most available form of administering metallic mercury.

LITHOLAPAXY IN MALE CHILDREN AND BOYS.

KEEGAN (*Lancet*, No. xxi., vol. i., No. 3639) states that in one year fifty-one male children were admitted to his service suffering from stone of the bladder. In only two cases was he obliged to have recourse to lateral lithotomy. In one case the stone was fixed and could not be made to fall between the blades of the lithotrite. He found on extirpating this stone a spur about one-third of an inch in length projecting from it posteriorly. This spur had become embedded in the mouth of one of the ureters and had prevented the seizing of the calculus with the lithotrite.

In the second case the stone lay partly in the bladder and partly in the prostatic urethra. In both of these lateral lithotomy was successful.

Keegan has now performed one hundred and seventy-five litholapaxies in male children and boys, and has lost four patients. Even this small mortality (three per cent.) was due to advanced kidney-disease in the subject operated upon. Together with his quota, two hundred and fifty-one litholapaxies in boys were performed in the hospital, with seven deaths, or a mortality of less than three per cent.

Freyer has performed one hundred and fifty-two litholapaxies in boys, with only two deaths; Denis, seventy-one, with three deaths; Goldsmith, fifty-two, with two deaths; Gimlette, fifty-nine, with one death; Cunningham, twenty-four, with no death; Hendley reports forty-four, with three deaths. Taking the combined figures, the total is, in three hundred and sixty-six operations, 2.71 per cent.

These results show that litholapaxy in boys is by all odds the best operation, provided the surgeon has at hand a supply of perfectly reliable and suitable instruments, and that he has

learned by experience to use them with judgment and dexterity. The chief merits that it possesses over cutting operations is that it is free from the dangers inherent in the latter, and the cure is far more rapid after litholapaxy than after lateral lithotomy. For these reasons, Freyer, who has performed one hundred and ninety-one consecutive lithotomies in boys without a death, has of late years almost abandoned the cutting operation for litholapaxy.

It is necessary in operating upon a child to extract every grain of *débris* from the bladder before removing him from the operating-table. Five or ten minutes spent towards the close of the operation in searching for the last particles of *débris* will be well and profitably employed. The points upon which Keegan especially insists in this operation are that there should be an ample supply of reliable lithotrites, all of the completely fenestrated pattern, and with canulæ with serviceable stylets. The surgeon should never withdraw a canula from the bladder, or introduce one, unless it be supplied with a stylet. Four ounces of water should be the maximum quantity allowed to be in the bladder at any given moment. The aspirator should be used gently and methodically, and water should not be injected into the bladder while the patient strains. Extreme gentleness and care are essential in practising all manipulations of instruments in the bladder and urethra. The operator should not be in a hurry to finish the operation, and if possible he should not leave a grain of *débris* behind in the bladder.

GUSSENBAUER'S SACRAL OPERATION.

Abbott (*Medical Record*, vol. xliii., No. 23) describes Gussenbauer's method of resecting the rectum.

The operation is begun by an incision of the bone in the median line from the tip of the coccyx up the sacrum for five inches. The upper extremity of this incision is then crossed by a transverse cut five inches in length. These flaps are not dissected up, the incision being carried through the coccyx and sacrum in the lines of the skin cuts, irrigation being kept up during the sawing. Thus are formed two triangular flaps of integument attached to the bone, each attached to half of the coccyx and of the three lower sacral vertebræ. These are easily separated from the connective-tissue binding of the peritoneum, and are carried to either side, giving a fine view and a large field for operation upon the pelvic contents. After extirpation of the rectum is completed the healthy gut is brought down and sewed to the integument for a new anus; the bony flaps are returned to their places, being held by catgut sutures through the periosteum only, and silk sutures passed through the integument. The inter-recto-coccygeal space is tamponed with iodoform gauze and the wound dressed in the ordinary manner.

THREE SUCCESSFUL CASES OF MYXŒDEMA.

Starr (*Medical Record*, vol. xliii., No. 23) reports three cases of myxœdema treated by the use of thyroid extract. This extract is prepared by means of glycerin. The first patient was given 6 drops three times a day, and improvement began ten days after treatment and has been progressive and continuous. Her mental condition improved to even a greater extent than her bodily state. The dose of the extract was increased until she was taking 10 drops three times a day, at which point it caused a feeling of exhaustion. The pulse was found to be over 100 and the temperature 99½° F. The dose was reduced to 8 drops. This was equivalent to ½ gland daily.

The second case was put upon 5 drops of the extract three times a day, increased gradually up to 20 drops. The improvement began three weeks after initiation of the treatment. In four months the patient was practically well, insomnia being the only symptom which persisted. This was relieved by mild doses of sulphonal and chloral. At the time of report she was still taking 30 drops of the extract three times a day.

The third patient was treated for some years for a variety of nervous symptoms due to the condition of myxœdema, which had evidently been present since 1880. The onset of the disease was very slow, the only constant symptoms being the swelling of the entire body, face, and extremities, extreme pallor, with anæmia, deafness, great nervousness, excitability, with occasional periods of depression, without apparent external cause, occipital pain, albuminuria, and a peculiar scaly, dry condition of the skin, with falling of the hair. The patient was given at the onset 10 drops of the thyroid extract three times a day. Within twenty-four hours the condition had changed; the reaction was so intense as to give rise to much alarm; the temperature had risen to 103° F., the pulse 160; the dyspnœa was extreme; the mental distress very alarming. Vigorous stimulation combated these symptoms in twenty-four hours.

After an interval of two weeks the extract was given in 5-drop doses twice a day, and this was gradually increased to 10 drops, which was the largest dose she could take without manifest discomfort. From the time the dose reached 8 drops three times a day the improvement began to be noticeable. After four months' treatment her appearance is wholly different from the preceding six years. She no longer has the appearance of undue obesity, the natural lines of her face have become perfect, the double chin, which was large, has disappeared, the rough, scaly skin has become soft and smooth, natural perspiration is restored, and there is a perceptible new growth of hair. The supraclavicular swellings have disappeared, her speech has become almost normal, her facial expression has changed for the better, her appetite and digestion are good, the urine has increased in amount, and now contains very little albumin and only occasional casts, but much more urea. The action of the heart is regular and moderate, and there are no longer attacks of faintness and dyspnœa. The mental improvement has been equally satisfactory. In all these cases the general permanent mental state resembled mild dementia. There was a lack of interest in subjects, a tendency to sit listless and unoccupied, a feeling of effort on mental exertion, and actual inability to fix the attention or to conduct a train of thought. Continuous conversation soon wearied them, and the mental weakness was very noticeable in all. All had suicidal impulses.

The thyroid extract is prepared by dissecting the glands of the sheep, together with the fascia, from the trachea. This is washed thoroughly in a saturated solution of boric acid. The fat is then dissected off, leaving the gland in its capsule, with the vessel attached. This is again washed in a saturated boric-acid solution. After this solution the glands are put into a sterilized towel, and with sterilized instruments the glandular tissue is carefully cut away from the fat, from the fascia, and from the vessels, so that only glandular tissue remains. This is then weighed. Each thyroid yields from ten grains to half an ounce. Glands of very large size, probably diseased, were rejected. The glandular mass having been thus prepared, is chopped very fine, and mixed with German double-distilled glycerin, which is sterilized by heat two days before use, and allowed to stand four days. The extract thus obtained is very carefully filtered through sterilized cotton under pressure, and presents the appearance of a red syrup. It will keep for a month without presenting any evidences of the development of micro-organisms. The amount of thyroid gland in a drachm of this extract is twenty-four grains, which is equivalent to an ordinary-sized gland. The usual dose of the extract is 30 drops daily in divided doses.

THE TREATMENT OF CONSTITUTIONAL SYPHILIS BY EXTERNAL METHODS OF ADMINISTRATION OF MERCURY.

SHAW-MACKENZIE (*Lancet*, No. 3636, 1893) strongly commends the treatment of constitutional syphilis by means of calomel fumigation. Next to this in efficiency rank mercury inunctions. For this purpose the oleate of mercury should be employed, twenty per cent. strength. Fifteen grains are sufficient for the initial dose. It is cleanly, rapid in action, and one or two rubbings a week are sufficient to keep a patient gently under the action of the drug. In fumigating the patient is surrounded by a cloak, or, better still, sits in a box with only the head exposed to the air. A spirit-lamp (over which a china receptacle holding a little water and the calomel powder separately is arranged) is placed under the seat or between the patient's legs. The wick being lighted, the calomel is sublimed, and with aqueous vapor is deposited on the patient's skin, after which the patient goes to bed, still in his cloak, or remains for an hour surrounded by a blanket. It is usual to begin with a drachm and a half of purified calomel and go up to two drachms, or reduce to one drachm, as necessary. The patient is advised to remain in-doors as much as possible, is seen once a week, and from a six weeks' to a three months' course is generally necessary, the gums being watched and the amount of calomel regulated by the effect produced. There should be no intermission of the daily or nightly bath, when the course has commenced, till all symptoms have subsided, when intermission may be gradually begun. The morning tepid bath need not be given up. It is important that the calomel should be thoroughly pure and the receptacle it sublimes from of china and not metal. With these precautions the fumes are not unpleasant; indeed, in many cases, it is desirable that they should, with limitation, be inhaled.

The advantages of the external or bath treatment are: (1) The satisfactory and safe way in which the effects of mercury may be induced and regulated; (2) the certainty of a successful result, with practical immunity from further and later serious manifestations; (3) no appreciable interference with general health or diges-

tion (the most debilitated may take the baths, and the debility of tertiary disease or phthisis does not contraindicate them); the writer has seen albuminuria and glycosuria in syphilitic subjects entirely disappear, and has known a woman to bear a full-term child who repeatedly aborted before her husband was put on a course of the baths; (4) shortening of the term of treatment; (5) the benefit of local fumigation to irritable sores and ulcers.

A NEW ANTISEPTIC MIXTURE.

CAVAZZINI (*La France Médicale*, 40 année, No. 22) advises the following as an antiseptic dusting-powder:

℞ Iodoform, 55 parts;
Salicylic acid, 20 parts;
Subnitrate of bismuth, 20 parts;
Camphor, 5 parts.

This mixture makes a light yellow powder which is without disagreeable odor. It is especially efficacious in ulcerating buboes. It is an active antiseptic, hence cicatrizes and prevents undermining of the skin. Indolent granulations are quickly stimulated and suppuration rapidly disappears.

Reviews.

APPENDICITIS AND PERITYPHLITIS. By Charles Talamon, M.D. Translated by E. P. Hurd, M.D.
Detroit: George S. Davis, 1893.

The translator has rendered a distinct service to many physicians by rendering accessible to them this admirable thesis of Talamon. The book opens with a brief historical and critical *résumé* in which the brilliant work of American authors, particularly that of Reginald Fitz, is given due credit. Indeed, it is stated that, as for the present description of the various forms of appendicitis, it is based entirely upon the result of the American methods. The existence of a typhlitis distinct from appendicitis is denied. The lesions, causes, and symptoms of appendicitis are fully and clearly described, a particularly instructive chapter upon the errors of diagnosis is given, and there is a judicial discussion of the medical and surgical treatment, followed by a few words upon the operative technique. This work, though it is perhaps simply a *résumé* of the scattered literature of the last few years upon the subject of appendicitis, cannot be too highly praised. It bears the impress of a brilliant mind, and is destined to rank as a classic. The general practitioner should be as familiar with its teachings as he is with his best-thumbed text-book.

SYPHILIS OF THE NERVOUS SYSTEM. By W. R. Gowers, M.D.
Philadelphia: P. Blakiston, Son & Co., 1892.

This little book of one hundred and thirty-one pages consists in a reprint of Gowers's Lettsomian Lectures for 1890, delivered before the Medical Society of London. It clearly states the views of Dr. Gowers upon the relationship between syphilis and the nervous system, and while three years old, nevertheless embodies the best and most generally accepted views concerning this important part of medicine.

DISEASE IN CHILDREN. A MANUAL FOR STUDENTS AND PRACTITIONERS. By James Carmichael, M.D., F.R.C.P. Illustrated.
New York: D. Appleton & Co., 1892.

The author tells us in his preface that in writing this manual he has tried to give a precise account of the clinical features of the more common diseases of childhood, and has assumed that the reader is acquainted with general medicine and the diseases of adult life.

The book opens with a chapter upon the prevention of disease in childhood, from which it is evident that the author has kept himself in touch with the recent advances made in the study of the relation of bacteria to disease. Following this chapter is one upon school hygiene and pathology, which contains many facts of interest to those who have not kept themselves abreast of recent studies in this branch of preventive medicine.

The third chapter is upon the clinical examination of the child, while chapter four begins the discussion of the fevers, the first of which is scarlet fever. After consideration of the various infectious diseases, including pneumonia, croupous pneumonia, and tuberculosis, syphilis and scrofulosis are discussed, and then diseases of nutrition, such as anæmia and rachitis.

Following the discussion of diseases of the respiratory apparatus, there is a chapter upon lactation and artificial feeding of infants, then one upon dentition, and after this a discussion of the alimentary, genito-urinary, and lymphatic systems, a number of chapters upon nervous diseases, then a chapter upon parasitic diseases, and one upon skin-affections closes the book so far as the general text is concerned, but a useful appendix is given in which

recipes may be found for the preparation of food for children who are ill. A fairly-copious index concludes the work, which is about the size of the book by Dr. Goodhart, which has been edited in this country by Dr. Louis Starr. The work does not profess to be an exhaustive one, and, used in connection with the larger treatises on this subject, will give the medical student or practitioner all necessary information.

LESSONS IN PHYSICAL DIAGNOSIS. By A. L. Loomis, A.M., M.D. Tenth edition, revised and enlarged. New York: William Wood & Co., 1893.

This book upon physical diagnosis, which has already reached its tenth edition, is still worthy of its great popularity. Perhaps one of the best points, aside from its scientific value, is the unusually large type and heavy leading, which render it easily read and studied. The illustrations are clear and the descriptions of the various physical signs lucid.

The size of the type and the heavy leading, which we have mentioned, do much towards making the book large when it is in reality, so far as the amount of material in it is concerned, rather small.

The title, "Lessons in Physical Diagnosis," shows that the author has endeavored to give the simple points which are of value in this department of medicine, and has not attempted to present a work as thorough or complete as the well-known book of Dr. Da Costa. Probably this is the best small book upon Physical Diagnosis which can be employed by the American medical student who is sufficiently patriotic to desire a book which has not a British origin.

CRÉOSOTE ET TUBERCULOSE, REVUE GÉNÉRALE. TRAITEMENT DE LA TUBERCULOSE PULMONAIRE PAR LA CRÉOSOTE ADMINISTRÉE PAR VOIE RECTALE. Par le Dr. Henri Audeoud.
Genève: Imprimerie, J. Stuber, 1893.

The author of this very complete monograph of two hundred and sixty odd pages having been kind enough to send a copy to the THERAPEUTIC GAZETTE, with the request for a review, we have taken much interest in careful study of his effort, and find much to praise in the useful summary which he has given of the subject.

Practically the reader finds in this book reference to all the literature which exists concerning the use of creosote in medicine. There are chapters upon its therapeutic employment in different doses and upon its administration by the stomach, the rectum, the lungs, and hypodermically. The active principle of creosote (guaiacol) is also studied, and bacteriological and clinical notes are given in profusion.

At the end of the essay there is a careful summary of the influence which creosote exerts over the various portions of the body and upon the different symptoms which are present in tuberculosis.

Finally, the book closes with a very copious and carefully-prepared bibliography of the subject, which, unlike many European bibliographies, is gotten up with sufficient care to contain reference to the best American papers. Throughout the essay there are a number of tables showing the effects obtained by the employment of creosote by different authors in different numbers of patients.

We congratulate the author upon having produced a very valuable contribution and summary to the therapeutic literature of to-day.

THE TREATMENT OF CONSTITUTIONAL SYPHILIS. By Oswald Ziemssen, M.D.
London: H. K. Lewis, 1893.

In this brochure Ziemssen states that on account of his particularly extended observations, although he is not a specialist, he brings before his professional brethren the results of an experience which he has gained with regard to curing constitutional syphilis in the course of more than twenty-five years' practice.

He opposes Kaposi's dictum, that syphilis is the most easily curable of all constitutional diseases, with one of his own, that syphilis is not incurable. In regard to prophylaxis, he holds that excision of the stump is a valuable adjuvant of the general methods, but is absolutely valueless in preventing the constitutional symptoms from developing. He believes that general treatment should be commenced as soon as possible after the infection, and that to neglect the use of well-known remedies is simply to abandon the patient to an existence of incalculable chance. As to the diaphoretic and diuretic methods, he holds that the use of decoctions and of thermal baths may occasionally effect a cure of slight forms of the disease, but in view of frequent relapses and the weakening effect of the treatment these methods cannot be recommended. Treatment by cold water and other baths is futile. In mercury he places absolute confidence. He holds that this drug has none other than a beneficial influence; that if its use sometimes appears to aggravate symptoms, it is the fault of the mode of administering it. Further, every relapse is the surest sign that the previous mercurial treatment has either been too short or too weak; the longer and the more energetically the mercurial treatment is carried out

the greater is the prospect of the patient being definitely cured.

The internal application of mercury by either the mouth or through the rectum he holds is somewhat unreliable, since the amount of absorption depends upon the condition of the gastro-intestinal tract. The introduction of mercury through the skin is, however, warmly commended. This may be accomplished either by hypodermic injection or friction. Hypodermic injection is rejected because of the pain it causes, the subsequent development of phlegmons or persistent indurations, the uncertainty of absorption, the inequality of distribution, and the difficulty in properly regulating the dosage. Inunctions represent the treatment of choice. Ziemssen holds that mercury, being very volatile in itself, when diffused in an ointment and spread on the skin, forms an atmosphere of mercury around the patient's body and enters the skin in a gaseous state. He is led to this conclusion by the fact that in all the mercury remaining on a patient's skin after the inunction is rubbed off with a sponge or cloth, without any pressure, no evidence of mercurial influence, or hardly any, is perceptible. Therefore, the quantity of mercury pressed into the skin is of little importance. These inunctions are carried out by trained nurses and by means of hollow glass pestles. Each inunction must last fifteen minutes, and after the rubbing the parts are always wrapped in flannel for a certain number of hours; this flannel bandage is kept on during the night, and when it has been laid aside the patient takes a bath; the ointment is then rubbed in in some other part. The ointment of choice is that made up of—

℞ Mercury, 20 parts;
Lanoline, 2 parts;
Suet, 2.8 parts;
Lard, 5.2 parts.

Inunction is the only treatment which allows of the dose of mercury being increased up to the maximum without endangering the patient's life. The thermal springs, in combination with mercury, are particularly serviceable, since they allow the absorption of a larger quantity of the drug, and hence permit of the treatment of syphilis by maximal doses.

In regard to the value of the test treatment by baths, this has been shown to be unreliable, since many cases at Aix-la-Chapelle, after taking the baths for five or six weeks, have been discharged as cured, and have had subsequent relapses. The iodide treatment gives only temporary amelioration, but is serviceable by its absorptive action, since it removes the hyperæsthetic changes of the tissues which have been produced by the specific microbe.

The book closes with the statement that the treatment of syphilis should be carried out, not, as is often the case, by a specialist in skin-diseases, but by a practitioner whose knowledge and experience extend over the whole range of medical art.

Correspondence.

MILWAUKEE LETTER.

(From our Special Correspondent.)

The Section of Ophthalmology of the American Medical Association.—The Section of Ophthalmology of the American Medical Association completed a successful and instructive session in the recent meeting at Milwaukee. Much praise is due to the able chairman, Dr. S. D. Risley, of Philadelphia, and his efficient secretary, Dr. H. Gradle, of Chicago, for their untiring efforts to bring together a number of communications that worthily take their place with those presented at previous meetings of this section, which has done its full share in advancing the best interests of American ophthalmology. An interesting feature of the occasion was the presence of Professor Zehender, who took part in some of the discussions. In the present communication only those papers can be noticed which contain distinctly therapeutic points.

After the address of the chairman, the first paper on the bulletin was by Dr. J. A. Lydston, of Chicago, Illinois, who described his method of treating pannus by digestive ferments. He reviewed the older measures, for example, trusting to the disappearance of the pannus with the subsidence of the granulations in the lids, the instillation of an infusion of jequirity, and distinctly surgical procedures, and then advised the management of trachomatous pannus with digestive ferments. He uses a mixture of papoid and boric acid, making a daily application. His experiments seem to show that drug acts better in alkaline medium. He also suggests that the extract of pancreatin might be used in the same way.

Dr. C. B. Blubaugh, of Parkersburg, W. Va., advocated the removal of the granulations in trachoma with small rakes, so shaped that they not only pass freely over the exposed tarsal conjunctiva, but reach also the retrotarsal fold and the margins of the lid. He follows his

scraping process by the use of an astringent. His operation appears to be a modified form of grattage, and although he reported excellent results in numerous cases, the paper failed to be explicit in classifying the varieties of trachoma,—a point of essential importance in the advocacy of any form of treatment of this disease.

Phlyctenular ophthalmia was discussed by Dr. Dudley S. Reynolds, of Louisville, Ky., the main points in his paper being that the disease depended essentially upon malnutrition, that the local treatment was of minor importance, and that the best results were obtained by building up the nutrition, with especial attention to the alimentary canal.

Purulent ophthalmia, from the stand-point of its specific microbic origin, was discussed by Dr. A. Hind, of Chicago, Ill. ; and Dr. Tiffany, of Kansas City, Mo., described the advantages of methyl-violet in various affections of the eye.

The second session was opened with a paper on quiescent foreign bodies within the eyeball, by Dr. W. B. Johnson, of Paterson, N. J., in which he described a number of cases in which foreign bodies had penetrated the vitreous chamber and had not produced symptoms of sympathetic irritation in the other eye, although long periods of time had elapsed.

This paper elicited a long discussion, the opinion being quite universal that although occasionally foreign bodies were quiescent, if reasonable efforts to extract them from the vitreous chamber were unsuccessful, the well-known tendency of such eyes to cause sympathetic irritation in the fellow-eye demanded operative interference,—usually enucleation or one of its substitutes. Professor Zehender took part in this discussion, referring particularly to the electro-magnet for the extraction of metallic foreign bodies, and also to the experiments which have been performed with magnets of great power in removing foreign bodies from the interior of the eye simply by their attractive power, and without the introduction of a magnet point within the ocular chambers.

Dr. Gifford, of Omaha, Neb., developed the point thus introduced by Professor Zehender, advocating a more general trial of this method and an extension of the experimental inquiries on this subject which had been undertaken in Europe.

Dr. F. C. Hotz, of Chicago, Ill., reported a case of sympathetic neuritis after evisceration, and incidentally showed that the cosmetic value of evisceration was not superior to that of a well-performed enucleation, owing to the shrinking of the stump, which invariably takes place after the performance of the former operation. He proved this point by a series of measurements made with a perimeter in the same way as the angle of strabismus is determined, and presented a table comparing the excursion made by a shell placed in a socket after enucleation and one inserted after evisceration. This table did not give evidence that the movement was greater after the latter operation.

In the discussion which followed this paper the method of performing evisceration received attention, Gifford, of Omaha, Neb., objecting to the tobacco-pouch suture, and preferring tamponment of the cavity with iodoform gauze. Reeves, of Toronto, Canada, is very careful to remove the ciliary nerves, then allows the cavity to fill with blood, after which he stitches the scleral edges together.

Dr. de Schweinitz, of Philadelphia, Pa., described a series of experiments which he had performed upon rabbits to test the value of intraocular injections of solutions of various antiseptic substances. He used in his experiments bichloride of mercury, 1 to 500, 1 to 1000, and 1 to 5000 respectively; cyanuret of mercury, 1 to 1000; trichloride of iodine, 1 to 1000; aqua chlorinata, officinal strength, and blue pyoktanin, 1 to 1000. The doses injected varied from two to five minims, and in each instance, save one of the experiments with aqua chlorinata, permanent lesions were produced in the vitreous, choroid, or retina. These lesions were demonstrated by a series of microscopic slides and photo-micrographs, and the conclusion of the paper was that this experimental inquiry was in direct opposition to the adoption of this method of therapeutics, although the reporter pointed out that a similar series of experiments on dogs should be performed, inasmuch as in one instance he had succeeded in checking an acute panophthalmitis in a mongrel cur by the injection of a strong solution of bichloride of mercury directly into the vitreous.

Dr. W. H. Wilder, of Chicago, after reviewing the literature of dendritic keratitis, reported three cases of his own which he thought were analogous to those ordinarily known as herpes of the cornea, in this classification following Horner's description. He believed that some of the cases were found in people suffering from malarial poisoning, and were consequently benefited by anti-malarial treatment, but that they also depended upon febrile affections, and probably all of them upon some impairment of nutrition.

Dr. J. A. White, of Richmond, Va., who described certain ocular complications in connection with fevers, recommended in atrophy of the optic nerve after fever, large doses of strychnine given in dilute phosphoric acid. In one of his cases he used a fifth of a grain three times a day with marked benefit.

Dr. Love, of Philadelphia, Pa., read a paper on glaucoma, describing the well-known phenomena of this disease and advocating strychnine and electricity in the early stages of the simple variety of the affection.

Dr. Gifford, of Omaha, Neb., advocated posterior sclerotomy as a preliminary to some operations for glaucoma. The operation is done subconjunctivally, with a narrow Graefe cataract-knife, the incision being about one-eighth of an inch long. This allows the pressure in the vitreous to fall, deepens the anterior chamber, and permits a more successful performance of iridectomy, or whatever other operation may be indicated, lessening the dangers of greatly-increased intraocular tension.

Dr. H. Gradle, of Chicago, commented upon diseases of the lachrymal passages, and divided the cases of lachrymal disease into two classes, according to the degree of lachrymation. In the one class the eye waters when exposed to wind, dust, or eye-strain; in the second class the weeping is continuous. Sometimes the source of irritation is an intranasal anomaly; more often disease of the tear-passage itself. He believed that the difference in results in different patients depended less upon the therapeutic measure than upon the nature of the disease. He recommended electrolysis of the duct in cases of stricture in which the probe failed to enter without undue force.

Dr. Casey A. Wood, of Chicago, in discussing the treatment of nasal duct obstructions, insisted on the necessity of recognizing the exact location of the disease, and presented a series of mirrors devised for inspecting the intranasal end of the lachrymo-nasal duct. He judges of the extent of the obstruction by the ability of the duct to transmit water when it is injected through the canaliculus. For this purpose he advises a syringe with a small point and large reservoir, or else an irrigator consisting of a reservoir connected with a flexible tube, with the ordinary tip for the nasal duct, and elevated some feet above the patient. When probes are to be used, he teaches the patient to pass them for himself. He is not favorable to slitting the canaliculus if this can be avoided.

Dr. B. Alexander Randall, of Philadelphia, regards the Weiss reflex as a sign of myopia. This curved reflex parallel and close to the nasal margin of the disk is best studied with a strong concave mirror. In his experience it has been conspicuous in cases of distending eyeball, and when he finds it he places the eyes under careful treatment, and hopes thus to prevent the further increase of myopia. It is also seen in eyeballs showing no tendency to distention, and, on the other hand, is absent in some cases of progressive myopia. Its presence, however, should always serve as an indication for careful treatment of the eyes.

Dr. A. R. Baker, of Cleveland, O., was successful in relieving temporarily by tenotomy of the external recti muscles a case of persistent spasm of accommodation, not benefited by glasses or the application of a mydriatic.

Dr. J. A. Thompson, of Kansas City, Mo., considered the operation for convergent squint one of the most difficult and uncertain in ophthalmic surgery. In the treatment of convergent squint in children glasses sometimes give relief, but rarely. When tenotomy is done, the effect of the operation should be divided between the two eyes. He favored the combination of tenotomy with advancement, but the advancement should always be capsular.

Dr. J. E. Colburn, of Chicago, described a series of cases in which, on account of inability to maintain binocular vision with comfort, the head was carried forward and backward, or to one side, with a corresponding distortion of the features. These cases often revealed squint or heterophoria, and relief was obtained by appropriate tenotomy. He called attention to the fact that the cases might be mistaken for wry-neck or spinal distortion, and consequently subjected to inappropriate treatment.

Dr. Boerne Bettman, of Chicago, described his method of artificial ripening of immature cataract, which has previously been abstracted at some length in the THERAPEUTIC GAZETTE. He renewed his belief that the operation was effectual, was never followed by iritis, dislocation of the lens, or other unfavorable results, and secured prompt and complete maturity of the cataract, except in cases of sclerosed lenses.

Numerous other papers appeared upon the bulletin presenting matters of great interest in ophthalmic science, but, inasmuch as they contained no directly therapeutic points, they are not abstracted in the present letter. A very important suggestion by the chairman, Dr. Risley, of Philadelphia, that hereafter a subject should be chosen for special collective investigation, was adopted. "The Method for the Objective Measurement of Refraction" was selected as the topic.